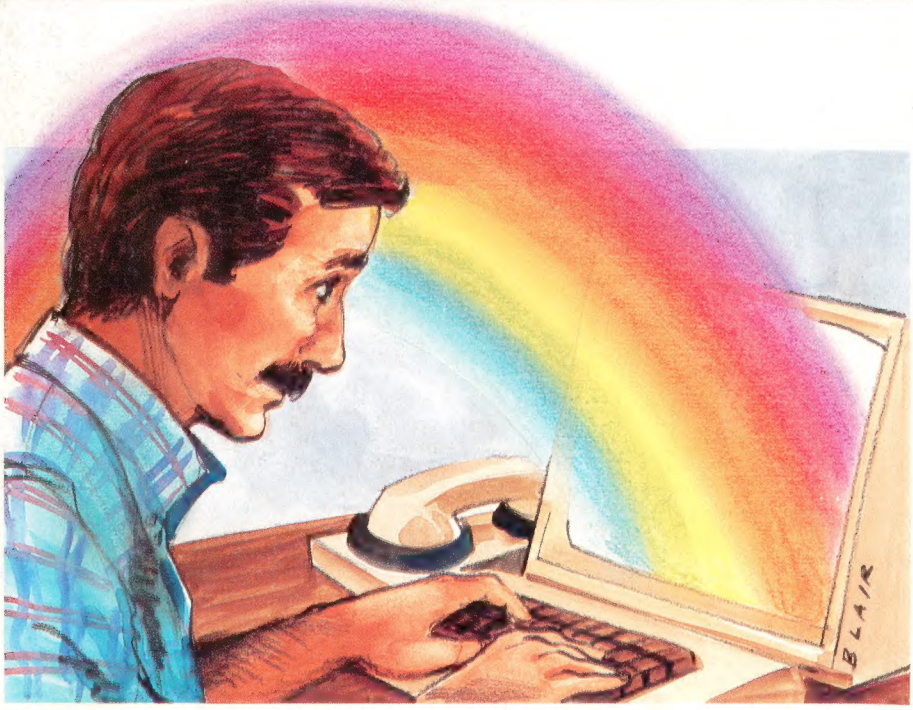
A Buyer's Guide To Modems

COMPUTE!'s GAZETTE

$2.95
November 1984
Issue 17 Vol. 2, No. 11
02220 $3.75 Canada

For Owners And Users Of **Commodore VIC-20**™ And **64**™ Personal Computers



Bulletin Board Fever

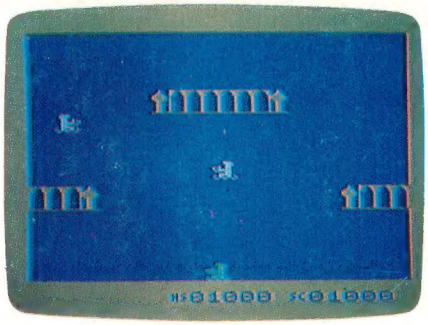
A look at the growth of telecommunications networks geared to Commodore owners.

Disk Auto Load For The 64

A handy utility that automatically loads and runs your BASIC or machine language programs.

C/G Term

Talk to other VIC and 64 users with the Color/Graphics Terminal program, the first in a series of integrated telecommunications software. Designed especially for ease of use.



Bagdad

Stay on your magic carpet and fend off the evil genies. Put them back in their bottles, but don't let them escape. A challenging arcade-style game for the VIC and 64.

Horizons:64

How does the new Plus/4 stand up to the 64? A revealing look at Commodore's new computer.

Also In This Issue:

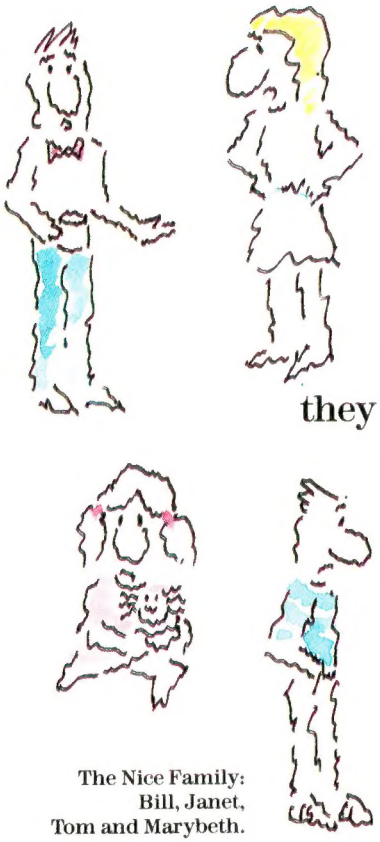
Function Key

Machine Language For Beginners: A VIC/64 Assembler

Programming Sound And Graphics With The Super Expander 64

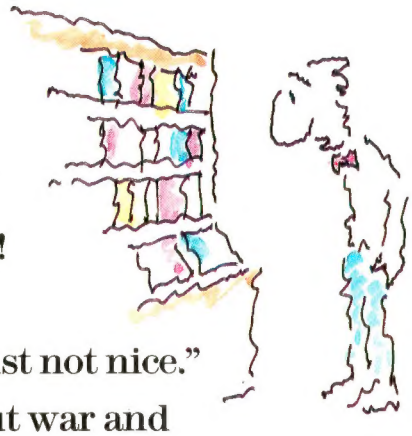
Plus an expanded reviews column

0 71486 02220 11



The Nice Family: Bill, Janet, Tom and Marybeth.

Once upon a time (it was 1984, in fact) and not so far away (right in your neighborhood), there lived a Nice Family: Bill and Janet Nice, and their children, Tom and Marybeth. The Nices owned a home computer, and they liked what they could do with it. But something was wrong. Every time they went to the store to buy a new game, no one was ever happy. ● "Oh no," said Janet Nice. "This won't do at all! These games are not for us!"



"You're right," said Bill. "They're just not nice." You see, all the games were about war and killing and hurting for no good reason. Things that the Nices didn't want the Nice children doing or even thinking about doing. So Mr. and Mrs. Nice decided to buy educational programs. But that made Tom and Marybeth unhappy, because they thought educational programs were—you know—B-o-r-i-n-g. What were these Nice people to do? ● Then, one day, they found some new games called *Adventures in Narnia*, part of the new LifeWare™ line from Word Publishing. The first two games were *Narnia* and *DawnTreader*, and they were based on the classic fantasies by C.S. Lewis. ● The Nice kids were happy because these games were loaded with action, adventure, excitement

For more information, call toll-free 1-800-433-3340.
In Texas, call toll-free 1-800-792-3270.

and challenge. Why, they even included things usually found in board games! So everyone in the family could get in on the fun! ● Mr. and Mrs. Nice were happy with *Adventures in Narnia* games, too, because they made their children *think*. And, of course, because the stories by C.S. Lewis present sound concepts and values (no other computer games do). "It's as if these games had our name on them!" said Janet Nice. ● Which brings us to the end of the story. It might be too much to say this family lived happily ever after. But they did live more happily with their computer—and with each other. ● And what could be nicer than that?

An *Adventures in Narnia* game includes diskette, a guide to Narnia, a free C. S. Lewis paperback book and playing pieces usually found in board games.

The End.

But not really. Your family's ***Adventures in Narnia*** are waiting for you at your local computer store or Waldenbooks store. Ask for *Narnia* and *DawnTreader*—the first two games in the ***Adventures in Narnia*** interface series—they're compatible with Apple II series® and Commodore 64™ home computers.

LIFEWARE™

from Word Publishing

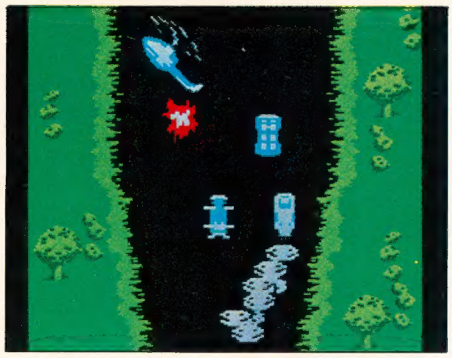
One of the ABC Publishing abc Companies

Available at all stores nationwide.

Waldenbooks

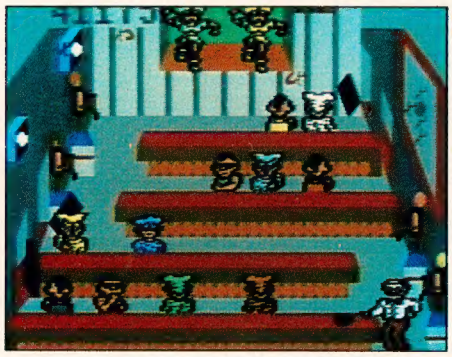
Apple II series is a registered trademark of Apple Computer, Inc. Commodore 64 is a trademark of Commodore Electronics, Ltd.

OUR ARCADE GAMES WE BROUGHT



Bally Midway's Spy Hunter puts you in the driver's seat of the hottest machine on four wheels. You're after enemy spies. The situation is life and death. You'll need every weapon you've got – machine guns, and guided missiles, oil slicks and smoke screens. But the enemy is everywhere. On the road, in the water, even in the air. So you'll have to be more than fast to stay alive in Spy Hunter. You'll need brains and guts, too.

Do you have what it takes?



Bally Midway's Tapper would like to welcome you to the fastest game in the universe.

You're serving up drinks in some of the craziest places you've ever seen. And the service better be good, or else. You'll work your way through the wild Western Saloon to the Sports Bar. From there to the slam dancing Punk Bar and on into the Space Bar full of customers who are, literally, out of this world.[1]

Are you fast enough to play Tapper? If you have to ask, you probably already know the answer.

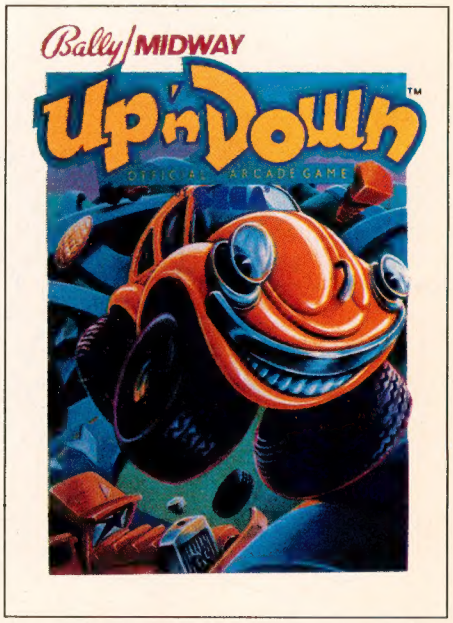
Bally Midway's Up 'N Down by Sega. In this game, a crash is no accident.

In fact, it's the whole object of the game. You'll race your baja bug over some of the worst roads south of any border. Leap dead ends, gaping canyons and oncoming traffic in a single bound. And if anyone gets in your way, crush 'em.

Crashing, bashing Up 'N Down. It's one smash hit that really is a smash.

The #1 Arcade Game of 1984.

Nominated as Most Innovative Coin-Op Game of 1984 by *Electronic Games* magazine.



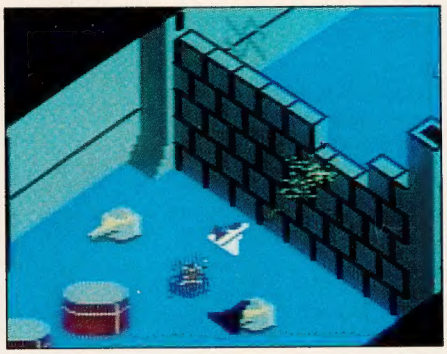
#1 Arcade Hit, *Play Meter* Conversions Poll, 8/1/84.

WERE SUCH BIG HITS, THEM HOME.

Sega's Congo Bongo rocked the home game world when it shot up to Number 3 on the Billboard chart this summer.

And now it's available for even more home systems. So check the chart and get ready for jungle action. You'll pursue the mighty ape Congo up Monkey Mountain and across the Mighty River. Do battle with dangerous jungle creatures. Ride hippos, dodge charging rhinos and try to avoid becoming a snack for a man-eating fish.

Congo Bongo. It's fast and it's fun. But be careful. It's a jungle in there.



Sega's Zaxxon. If you haven't played Zaxxon, you must have been living on another planet for the past few years.

And now the ultimate space combat game is available for even more home systems. You'll pilot a space fighter through force fields and enemy fire on your way to do battle with the mighty Zaxxon robot. Countless others have gone before you in this Hall of Fame game. But this time your life is in your own hands.

Zaxxon killed them in the arcades. But compared to what it will do to you at home, that was child's play.

	SPY HUNTER	TAPPER	UP 'N DOWN	CONGO BONGO	ZAXXON
Atari 2600 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓
Atari 5200 cartridge				✓	✓ NEW
Atari Computers* cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Atari Computers† diskette	✓ NEW	✓ NEW	✓ NEW		✓
ColecoVision & ADAM cartridge	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Commodore 64 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Commodore 64 diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Apple II, IIe, IIc diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
IBM PC diskette	✓ NEW	✓ ** NEW	✓ NEW	✓ ** NEW	✓ ** NEW

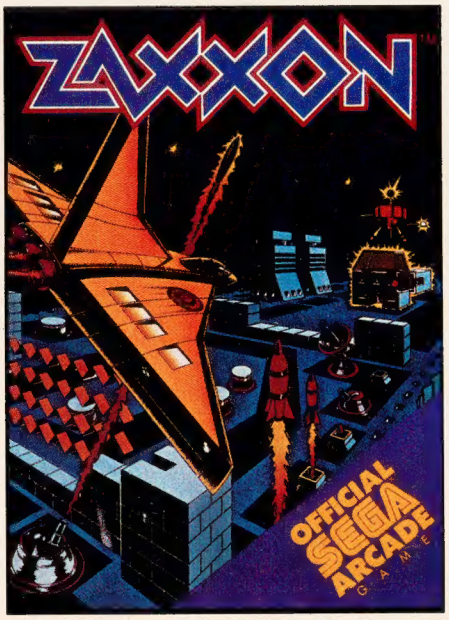
✓ Published by Sega Enterprises, Inc.
✓ Published by Datasoft, Inc. under license from Sega Enterprises, Inc.
✓ Published by Coleco Industries, Inc. under license from Sega Enterprises, Inc.
✓ Published by Synapse Software Corporation under license from Sega Enterprises, Inc.
*Atari 400, 800, 600XL, 800XL and 1200XL. (Congo Bongo cartridge: 400, 800 and 800XL.)
†Atari 800, 600XL, 800XL and 1200XL.
**Also available for IBM PCjr.

All new games are scheduled to be in your stores for Christmas. Check your local dealer.

© 1984 Sega Enterprises, Inc.

[1]Number of game levels varies on cartridges for Atari and Commodore systems. Atari, 2600, 5200, 400, 800, 600XL, 800XL, and 1200XL are trademarks of Atari Corporation. Commodore 64 is a trademark of Commodore Electronics, Inc. ColecoVision and ADAM are trademarks of Coleco Industries, Inc. Apple, II, IIe, and IIc are trademarks of Apple Computer, Inc. IBM, PC and PCjr are trademarks of International Business Machines Corp. UP 'N DOWN is a trademark of Sega Enterprises, Ltd., manufactured under license from Sega Enterprises, Ltd., Japan. Videogame copyright © 1983 Sega Enterprises, Ltd. BALLY MIDWAY is a trademark of Bally Midway Mfg. Co. Package and program copyright © 1984 Sega Enterprises, Inc. TAPPER and SPY HUNTER are trademarks of Bally Midway Mfg. Co. Videogame copyright © 1983 Bally Midway Mfg. Co. All rights reserved. ZAXXON is a trademark of Sega Enterprises, Inc. Copyright © 1984, Sega Enterprises, Inc. CONGO BONGO is a trademark of Sega Enterprises, Inc. Copyright © 1983, Sega Enterprises, Inc.

Arcade and Home Smash. Hit #3 on *Billboard* magazine's Top Video Games survey.

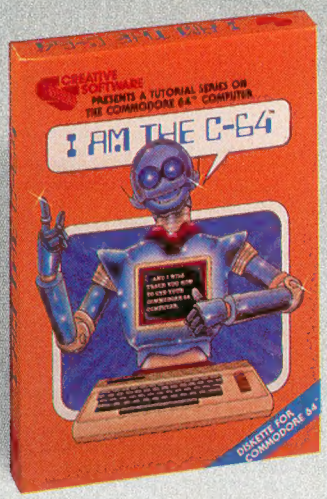


One of only ten games ever to make *Electronic Games'* Hall of Fame.

TWO SURE WAYS TO GET MORE OUT OF YOUR COMMODORE 64

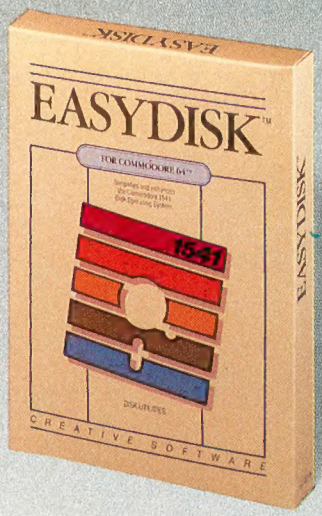
I AM THE C-64 provides you with a friendly and patient private tutor. This series is the perfect guide to learning all the power your Commodore 64 has to offer.

- Complete six-volume series.
- Each operation you can perform is explained in simple terms right on the screen; no more struggling with confusing manuals.
- Includes overall introduction to the Commodore 64 and its keyboard.
- Learn BASIC programming language as well as advanced programming techniques.
- Advanced series guides you through music and sound effects and sprite graphics.



EasyDisk eliminates disk based aggravation. It saves time and adds extra features, all at the touch of a key. A must for all Commodore 64 disk drive owners.

- Simplifies the Commodore 1541 Disk Operating System.
- Organizes all the commands in a simple, easy-to-follow menu.
- Allows you to select and execute commands with just a few simple keystrokes.
- Provides full disk backup (using just one drive).
- Doesn't interfere with the normal operation of your computer; it's simply there when you need it.



C R E A T I V E S O F T W A R E

230 East Caribbean Drive, Sunnyvale, CA 94089

©1984 Creative Software

"Commodore 64" is a trademark of Commodore Electronics, Ltd.

NOVEMBER 1984 Vol. 2, No.11

FEATURES

Bulletin Board Fever *Kathy Yakal* ..... 16 *
A Buyer's Guide To Modems *Sharon Darling* 30 V/64
GAZETTE Telecommunications Software, Part 1: C/G Term *Robert Sims* 38 V/64
Inside View: Free Fall Associates *Selby Bateman* ..... 52 *

REVIEWS

EasyDisk *Harvey B. Herman* 94 64
MusiCalc *Arthur B. Hunkins* 98 64
Adventure Creator *C. Regena* 104 64
***Drol* And *Spare Change* For The Commodore 64** *George Miller* 107 64
Also Worth Noting 110 64

GAMES

Bagdad *Bryan Files* 56 V/64
Jump *Fernando Ciccarelli and Marcel Ferreira* 62 V/64
Supertank *Boris Litinsky* 64 64
Descent To Kaylon *Steve Stiglich* 66 V/64

EDUCATION/HOME APPLICATIONS

Computing For Families: A Look At New Books From "Reggie" D'Ignazio *Fred D'Ignazio* ..... 70 *
Budgeteer *Robert N. Pineau* 76 V/64

PROGRAMMING

BASIC Magic: The Four Most Important BASIC Commands *Michael S.Tomczyk* 80 V/64
Machine Language For Beginners: Getting Started *Richard Mansfield* 116 V/64
Power BASIC: Slowpoke *Daniel R. Widyono* 138 V/64
Hints & Tips: Creating Program Listing Files *Richard N. Wilfong* 142 V/64
Programming Sound And Graphics With The *Super Expander 64* *Lee Noel, Jr* 155 64
Function Key *Willie Brown* 160 V/64
Disk Auto Load *Dan Carmichael* 164 64

DEPARTMENTS

The Editor's Notes *Robert C. Lock* ..... 6 *
Gazette Feedback *Editors & Readers* ..... 10 *
User Group Update ..... 90 *
Simple Answers To Common Questions *Tom R. Halfhill* ..... 134 *
Horizons: 64 *Charles Brannon* 146 64
VICreations: VIC Mailbag *Dan Carmichael* ..... 152 VIC

PROGRAM LISTINGS

MLX 167 V/64
How To Type In COMPUTE!'s Gazette Programs ..... 168 *
The Automatic Proofreader 169 V/64
Program Listings 170 V/64
Bug-Swatter: Modifications And Corrections 221 V/64

Product Mart ..... 221 *
Advertisers' Index ..... 224 *

*=General, **V**=VIC-20, **64**=Commodore 64.

COMPUTE!'s GAZETTE is published monthly by **COMPUTE!** Publications, Inc., Post Office Box 5406, Greensboro, NC 27403 USA. Phone (919)275-9809. Editorial offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic subscriptions: 12 issues, $24. Send subscription orders or change of address (P.O. Form 3579) to Circulation Dept., *COMPUTE!'s GAZETTE*, P.O. Box 961, Farmingdale, NY 11737. Second class application pending at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright © 1984 by **COMPUTE!** Publications, Inc. All rights reserved. ISSN 0737-3716.

COMPUTE! Publications, Inc., One of the ABC Publishing Companies: ABC Publishing, President, Robert G. Burton; 1330 Avenue of the Americas; New York, New York 10019.

THE EDITOR'S *notes*

GAZETTE *Editor Lance Elko contributes a guest editorial this month.*

Robert Lock, Editor In Chief

At last June's Consumer Electronics Show, the prototype of a very powerful, new personal computer was demonstrated inside a closed, invitation-only suite. The computer was manufactured by a small Silicon Valley company, the Amiga Corporation, previously known only as a manufacturer of joysticks. Amiga was looking for capital to finish developing the rough prototype and move it into mass production.

Code-named *Lorraine,* the computer wowed the few who saw it. Although it houses the same microprocessor found in Apple's Macintosh—the 16/32-bit Motorola 68000 chip—it could leave the Mac in the dust. Consider that the Amiga was designed to come with 128K of RAM (expandable to 512K internally and several *megabytes* externally); a built-in 320K double-sided disk drive (IBM-compatible), expandable to several more floppy drives and a hard disk; built-in speech software and modem; four sound channels with synthesizer capabilities similar to the Commodore 64's; medium- and hi-res graphics (with an astonishing 4096 colors); eight sprites (with up to 16 colors each); standard parallel and serial interface ports; outputs for TV, composite video, and two types of RGB monitors; and a lot more. Plus, original plans called for it to be bundled with its own operating system, word processor, and spreadsheet.

The retail price? With all the above features, Amiga claimed the Lorraine would sell for under $1400.

Although the power of this new machine surprised many industry watchers, what surprised them more was the August announcement that Commodore had purchased the Amiga Corporation—and what could be the most powerful personal computer yet developed.

Not to be denied, Atari, under Jack Tramiel's new leadership, filed a $100 million suit against Amiga, contending that Atari had already made a deal with Amiga to obtain the new custom chips which make the Lorraine possible. This lawsuit came several weeks after Commodore had filed litigation against a group of engineers who left Commodore to join Atari. Commodore claims the engineers took with them some of Commodore's computer design secrets. An interesting game of one-upmanship, perhaps?

As one Commodore source noted during this writing, no court injunctions have been granted in either case, and Commodore is continuing with its plans to market the Lorraine—possibly for under $1000.

Whatever the results of the suits and countersuits, Commodore and Atari seem to be planning more powerful and less costly computers for the future. The outcome may depend on home computer sales this Christmas. Commodore leads in the under-$1000 market by a wide margin, but with Tramiel now heading Atari and the Japanese preparing to distribute MSX-based computers, we can expect renewed activity on the price/features front in 1985.

Telecommunications Software Series

Beginning with this issue, we're introducing a series of integrated telecommunications software, which includes a terminal program and a bulletin board. "C/G Term," which starts on page 38 in this issue, is designed for the VIC and 64 and is easy enough for a novice to use.

What makes this terminal program unique is that it eliminates nearly all the cryptic codes and tedious chores normally associated with the operation of terminal software. For example, you don't have to worry if you're sending or receiving a letter, program, or color graphics screen. The program figures it out and does the hard work.

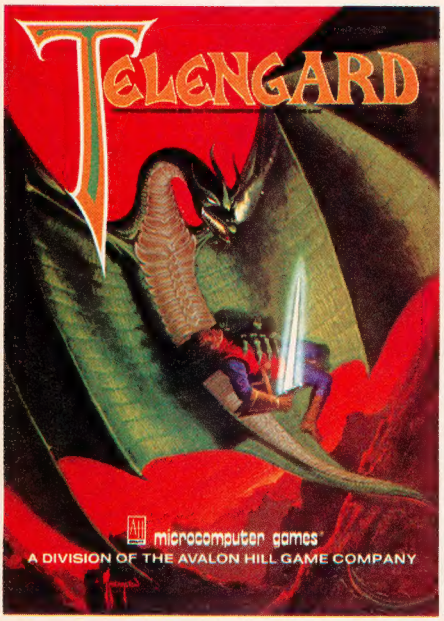
Next month, we'll publish the first half of the listing for the bulletin board system, designed for the Commodore 64 and for use with C/G Term. The remaining half will appear in the January issue.

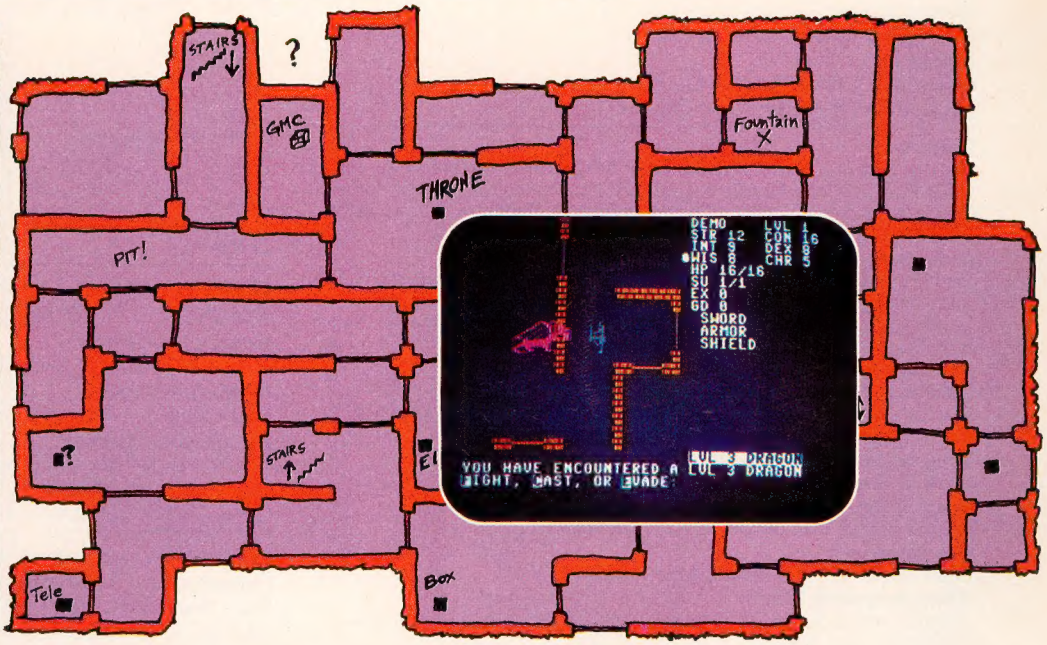
Until next month, enjoy your GAZETTE.

Lance Elko
Editor

In the October issue, page 132, we incorrectly noted the phone number of the *Modem Times*. The correct number is (303) 578-5405.

Be Amazed!





Telengard: How low can you go?

We've created a subterranean monster. Fifty stories low.

That's the number of levels in the TELENGARD dungeon.

Each labyrinthine level holds hundreds of dark chambers and tomb-like corridors for the mighty adventurer to explore. It goes without saying that a shifting collection of hideous monsters with unpredictable behavior patterns can make life in the TELENGARD maze quite interesting—and frequently quite short!

Using wits, magic and true grit, your character delves deeper and deeper into the depths of TELENGARD in this realtime fantasy role-playing game. Available on cassette for Commodore® 64, Atari® Home Computers (40K), for a ghoulish $23.00. 48K diskettes for Apple® II, Atari®, Commodore® 64 and TRS-80® available also, for $28.00.

AND FOR THOSE WHO DON'T DIG UNDERGROUND GAMES . . . There's **B-1 NUCLEAR BOMBER**, a nail-biting solitaire simulation of a manned B-1 on a mission over the Soviet Union. Your plane is equipped with six Phoenix Missiles, a one megaton warhead and orders to retaliate! Cassette for Commodore 64, Atari Home Computers (32K), TI99/4 & 4A (16K), VIC-20 (16K), Timex/Sinclair 1000 (16K), and TRS-80 Mods. I/III (16K) are available for an explosive $16.00. Diskette versions for Apple (48K), TRS-80 (32K), Atari (24K) and IBM (48K) just $21.00.

NUKEWAR: Defend your country by massive espionage efforts, or by building jet fighter bombers, missiles, submarines and ABM's. Your cold and calculating computer will choose its own strategy! Cassette for Commodore 64, VIC-20 (16K), TRS-80 Mods. I/III (16K) and Atari Home Computers just $16.00.

FOOTBALL STRATEGY: Animated action on a scrolling field. A head-to-head challenge or solitaire as you select the best offensive or defensive plays in response to your opponent. Commodore 64, Atari Home Computers (32K) and TRS-80 Models I/III/IV (16K) cassette for $16.00. Atari (32K), IBM (64K) and TRS-80 Models I/III/IV (32K) diskettes available at $21.00.

T.G.I.F.: Thank Goodness It's Friday! Avalon Hill's new party game for one to four players recreating an often-not-so-typical week in the lives of the working class. Half the fun is just making it from Monday to Sunday. Commodore 64, Atari Home Computers (40K) cassette for a meager $20.00. Atari diskette (48K) for $25.00.

AVAILABLE WHEREVER GOOD COMPUTER GAMES ARE SOLD or call Toll-Free: 1 (800) 638-9292 for the name of a store near you. Ask for Operator C.

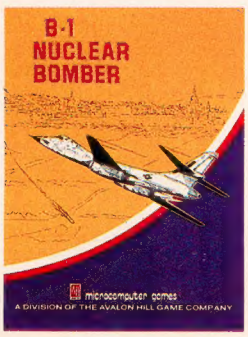
microcomputer games

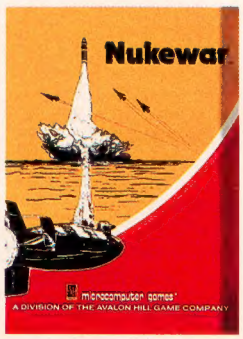
a Division of

Avalon Hill Game Company

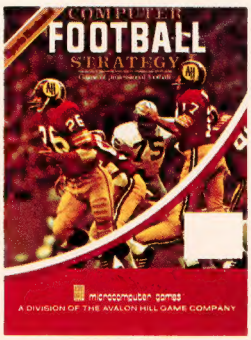
4517 Harford Road, Baltimore, MD 21214 U.S.A. Earth

* Trademarks of Tandy Corp., Apple Computers, Commodore Business Machines, Warner Communications and International Business Machines.





AH QUALITY



COMPUTE!™ Publications, Inc. abc
One of the ABC Publishing Companies

Publisher Gary R. Ingersoll
Editor in Chief Robert C. Lock
Director of Administration Alice S. Wolfe
Senior Editor Richard Mansfield
Managing Editor Kathleen Martinek
Editor Lance Elko
Assistant Editor Todd Heimarck
Production Director Tony Roberts

Editors
Tom R. Halfhill, Editor, COMPUTE! Magazine; Stephen Levy, Editor, COMPUTE! Books Division; Gail Walker, Production Editor; Ottis R. Cowper, Technical Editor; Charles Brannon, Program Editor; Selby Bateman, Features Editor
Assistant Editors
Dan Carmichael (Submissions); Gregg Keizer, Steve Hudson (Books); John Krause, George Miller, Philip Nelson (Technical); J. Blake Lambert, Robert Alonso (Publications); Kathy Yakal, Editorial Assistant, Sharon Darling, Research Assistant (Features), Randall Fosner, Assistant Managing Editor (Books)
Editorial Programmers
Patrick Parrish (Supervisor), Gregg Peele (Assistant), Tim Victor, Kevin Mykytyn, Gary Black, Kevin Martin, Chris Poer
Programming Assistants
Mark Tuttle, David Florance
Copy Editors
Juanita Lewis, Joan Rouleau, Ann Davies
Proofreaders
Ethel Silver, Dwight Smith, Marty Selby
Administrative Staff
Vicki Jennings, Laura MacFadden, Julia Fleming, Susan Young, Iris Brooks, Jan Kretlow

Production
Irma Swain, Production Manager; Janice Fary, Art & Design Director, Lee Noel, Assistant Editor, Art & Design; De Potter, Mechanical Art Supervisor; Terry Cash, Carole Dunton, Typesetting
Artists
Leslie Jessup, Larry Sullivan, (Publications), Debbie Bray (Books); Harry Blair, Illustrator

Associate Editors
Jim Butterfield (Toronto), Harvey Herman (Greensboro), Fred D'Ignazio (Roanoke)

Circulation
Charles C. Post, Circulation Manager

Operations/Customer Service
Patty Jones, Subscriber Services Supervisor; Assistants: Chris Patty, Sharon Sebastian, Rosemarie Davis; Fran Lyons, Dealer Sales Supervisor; Assistants: Gail Jones, Sharon Minor, Rhonda Savage
Customer Service Staff
Dorothy Bogan, Supervisor; Judy Taylor, Anita Roop, Debi Goforth, Jenna Nash, Elizabeth White, Mary Hunt, Gayle Benbow, Betty Atkins, Chris Gordon; Jim Coward (Warehouse Manager), Larry O'Connor, Dai Rees, Jack McConnell, Eric Staley, Eddie Rice, Sam Parker, David Hensley, John Archibald; Mary Sprague, Mail Room Coordinator

Data Processing
Leon Stokes, Manager; Chris Cain, Assistant

Accounting
Paul J. Megliola, VP, Finance & Planning; R. Steven Vetter, Director, Finance & Planning; Robert Bean, General Accountant; Karen K. Rogalski, Financial Analyst; Staff: Anna Harris, Jill Pope, Shannon Roesler
Credit
Barry L. Beck, Credit Manager; Staff: Sybil Agee, Susan Booth, Anne Ferguson, Pat Fuller, Doris Hall, Linda Miller, Mary Waddell
Purchasing
Gregory L. Smith, Purchasing Manager

Promotion
Mindy K. Kutchei, Promotion Manager
Advertising Sales
Ken Woodard, Director of Advertising Sales; Bonnie Valentino, Assistant Advertising Manager; Patti Williams, Production Coordinator; Joyce Margo, Production Assistant; Kathleen Hanlon, Sales Assistant
Sales Representatives

Jerry Thompson	415-348-8222
Phoebe Thompson	408-354-5553
Ed Winchell	213-378-8361
Harry Blair	919-275-9809

Jules E. Thompson, Inc.
National and Canadian Sales Representatives
1290 Howard Avenue, Suite 303
Burlingame, CA 94010

Address all advertising materials to:
Patti Williams, COMPUTE!'s GAZETTE
324 West Wendover Ave., Suite 200, Greensboro, NC 27408
Sales Offices, The Thompson Company

New England	617-720-1888
Mid-Atlantic	212-772-0933
Southeast	919-275-9809
Midwest	312-726-6047
Texas	713-731-2605
Northwest, Nevada	408-354-5553
Northern CA	415-348-8222 or 408-354-5553
Southern CA	213-378-8361
Arizona	213-378-8361
New Mexico	213-378-8361
Colorado	303-595-9299

COMPUTE! Publications, Inc., publishes
COMPUTE! **COMPUTE! Books** ***COMPUTE!'s GAZETTE***
Corporate Office:
324 West Wendover Ave., Suite 200, Greensboro, NC 27408
Mailing Address:
Post Office Box 5406, Greensboro, NC 27403
Distribution Center
505 Edwardia Drive, Greensboro, NC 27409
Telephone: 919-275-9809
Office Hours: 8:30 AM to 4:30 PM Monday–Friday

Chief Executive Officer Robert C. Lock
President Gary R. Ingersoll
Vice President, Finance & Planning Paul J. Megliola
Executive Assistant Debi Nash
Assistant Cassandra Robinson

Subscription Information
COMPUTE!'s GAZETTE Circulation Dept.
P.O. Box 5406, Greensboro, NC 27403

TOLL FREE
Subscription Order Line
800-334-0868
In NC 919-275-9809

COMPUTE!'s GAZETTE
Subscription Rates

(12 Issue Year): US (one year) $24. Canada, Mexico and Foreign Surface Mail $30. Foreign Air Mail $45.

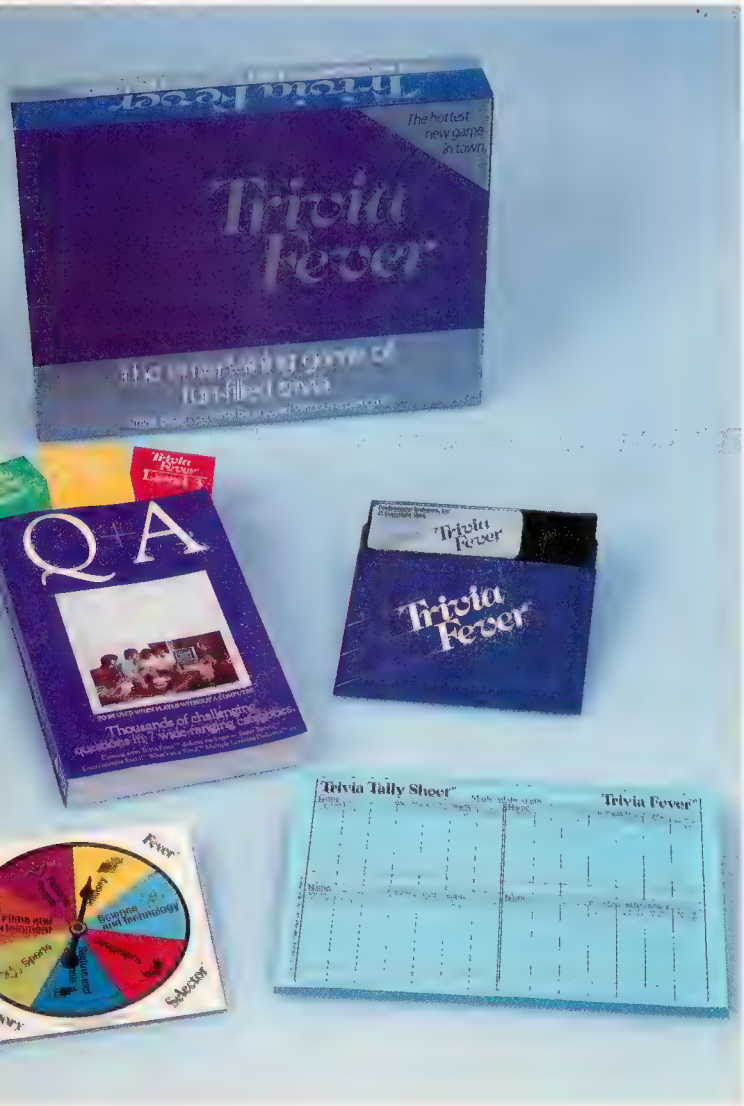
The COMPUTE!'s GAZETTE subscriber list is made available to carefully screened organizations with a product or service which may be of interest to our readers. If you prefer not to receive such mailings, please send an exact copy of your subscription label to: COMPUTE!'s GAZETTE, P.O. Box 961, Farmingdale, NY 11737. Include a note indicating your preference to receive only your subscription.

Authors of manuscripts warrant that all materials submitted to COMPUTE!'s GAZETTE are original materials with full ownership rights resident in said authors. By submitting articles to COMPUTE!'s GAZETTE, authors acknowledge that such materials, upon acceptance for publication, become the exclusive property of **COMPUTE!** Publications, Inc. No portion of this magazine may be reproduced in any form without written permission from the publisher. Entire contents copyright © 1984, **COMPUTE!** Publications, Inc. Rights to programs developed and submitted by authors are explained in our author contract. Unsolicited materials not accepted for publication will be returned if author provides a self-addressed, stamped envelope. Where programs are included in an article submission, a tape or disk must accompany the submission. Printed listings are optional, but helpful. Articles should be furnished as typed copy (upper and lowercase, please) with double spacing. Each article page should bear the title of the article, date, and name of the author. **COMPUTE!** Publications, Inc., assumes no liability for errors in articles or advertisements. Opinions expressed by authors are not necessarily those of **COMPUTE!** Publications, Inc. **COMPUTE!** Publications assumes no responsibility for damages, delays, or failure of shipment in connection with authors' offer to make tape or disk copies of programs published herein.

PET, CBM, VIC-20, and Commodore 64 are trademarks of Commodore Business Machines, Inc., and/or Commodore Electronics Limited. Other than as an independent supplier of quality information and services to owners and users of Commodore products, **COMPUTE!** Publications, Inc., is in no way associated with Commodore Business Machines, Inc., or any of its subsidiaries.

Catch Trivia Fever™

"The Hottest New Game In Town"



At $39.95, Trivia Fever comes complete with Question and Answer Book, Category Selector, and Tally Sheets to be used when played without a computer.

Trivia Fever is absolutely unique — it's the only software entertainment package that can be enjoyed ***with*** or ***without*** a home computer! When played on your home computer, Trivia Fever is a refreshing alternative to all those shoot'em up games. An elected "Master of the Game" uses the computer to randomly select subject categories, handicap players, generate questions and answers, keep score automatically, and more! Instructive by its very nature, Trivia Fever can be enjoyed by up to 8 individuals or teams. And when played without a computer, Trivia Fever has all the best features of the "popular" trivia games plus more — all without the cumbersome board, cards, and little game pieces. You can play in a car, on vacation, anytime, anywhere! And Trivia Fever is by far the best Trivia game available anywhere. Here's why:

Trivia Fever offers thousands of challenging questions in 7 interesting categories, so there's something for everyone. Each category has questions with 3 levels of difficulty, which score comparable points. What's more, Trivia Fever allows players to HANDICAP all those so-called "trivia experts" three different ways, giving everyone a chance to win. And players can easily control the length of play from quick thirty minute games to multi-hour party marathons!

Trivia Fever is unique, entertaining, educational, and most of all FUN. And at $39.95, Trivia Fever is destined to quickly become the best selling software entertainment package of all time. There's even a $5 rebate available to any non-computer users who return the computer diskette.

Trivia Fever can be enjoyed on the Commodore 64, IBM PC & PCjr and compatibles, Apple II series, and others. So don't delay. Catch Trivia Fever at your favorite software retailer today!

For additional information call 617-444-5224, or write to:

PSI P.O. Box 533
Needham, MA 02194

Trivia Fever is a trademark of Professional Software, Inc.

GAZETTE FEEDBACK

Editors And Readers

Do you have a question or a problem? Have you discovered something that could help other VIC-20 and Commodore 64 users? Do you have a comment about something you've read in COMPUTE's GAZETTE? We want to hear from you. Write to Gazette Feedback, COMPUTE's GAZETTE, P.O. Box 5406, Greensboro, NC 27403.

Better Pictures

In most of your programs, the graphics tend to be significantly better for the VIC-20 than they are for the 64. Can you explain why this is?

Eric Miller

Very simply, the reason is because of the difference in size of the characters. The VIC has 22 characters per screen line, while the 64 has 40. This means that the VIC's characters are larger and sharper. Hence, the better picture.

Mysterious DATA Statements

In some of your programs, you have lines such as: *DATA John,Jerry*. What exactly does that mean? What do DATA statements really do in a program?

Brian Dempsey

DATA statements are used to store information within a program. Data stored in this fashion is an integral part of the program, as opposed to being stored externally on a disk or tape.

DATA statements themselves are not executed. When a program is running and it comes upon a DATA statement, it skips to the next BASIC command. For this reason, it's best to place them at the end of the program.

The information in DATA statements is accessed with the READ statement. Data can be either numeric or string, although there are a few characters (commas and quotation marks, for example) which can cause problems. Multiple items of data within one DATA statement are separated by a comma. A DATA statement containing both numeric and string data might look like this:

```
10 DATA 1,2,3,Charles,Todd,Kathy
```

The READ statement retrieves data within a DATA statement from left to right, in sequential order. The DATA statement with the lowest BASIC line number is read first. Enter and run this example, which will READ and PRINT names from a DATA statement:

```
10 READA$:IF A$="END" THEN END
20 PRINTA$
30 GOTO 10
40 DATA TOM,GEORGE,DICK
50 DATA HARRY,FRED,PERCY
60 DATA END
```

Also, we've covered this subject in depth in past issues. See especially November 1983, page 150.

What's Zero Page?

I've often come across the term *zero page*. I'd like to know what this term means, and what it's used for.

Rob Gronemann

In the terminology of machine language, a page *is 256 continuous bytes of memory. There are 256 pages of memory (64K) in a Commodore 64 or VIC-20; some are RAM and some ROM, although in an unexpanded VIC some pages are empty.*

Since programmers begin counting at zero, zero page *is the first page of memory, locations 0–255. This area of memory is especially important to machine language programmers because there are many ML instructions which work only on the contents of zero page locations. For example, the BASIC language itself, which is actually a collection of machine language routines, makes use of almost all of the locations in zero page.*

PEEKing The Joystick

While programming my Commodore 64, I've found these PEEKs for use in programs that use the joystick. Use this formula:

PEEK(56321) AND *A* for joystick port 1
or
PEEK(56320) AND *A* for joystick port 2

where *A* is one of the numbers in the table listed below.

Value of *A*	Joystick Function Desired
1	up
2	down
4	left
5	up and left
6	down and left

Net Worth Your Personal™

Its only business is managing your home finances. No program does it more quickly, more easily, more directly.

Your Personal Net Worth systematizes the management of your household income, expenses, credit cards and check books — using methods tested for accuracy by Touche Ross, one of the nation's leading accounting firms.

Your Personal Net Worth puts your computer to work, keeps your records straight, including your personal inventory of valuables and stock portfolio, tells you where and how you're spending your money or if you're making a shambles of your budget. And does it all in less time than it takes you to balance your check book.

Nothing else — no other program at twice the price — makes handling your personal money matters simpler, faster and more direct than **Your Personal Net Worth.**

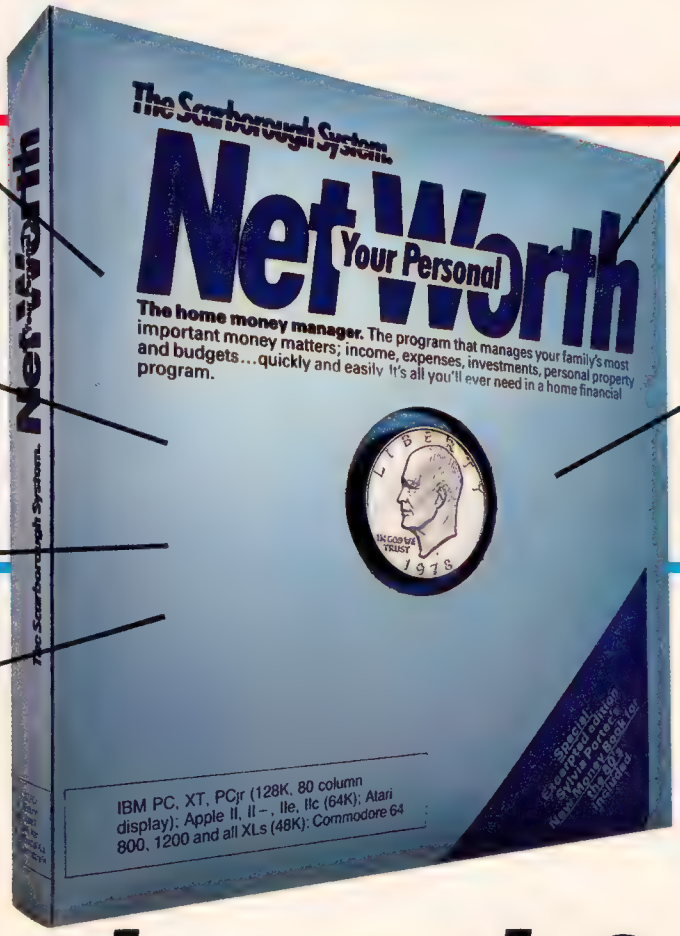
You'll find it at your favorite software retailer in the silver box with the real silver dollar on the front. It could be the single most valuable purchase you'll ever make.

Record all banking and any credit card transactions, reconcile bank statements instantly (up to 10 separate bank accounts can be handled), — print checks, too.

Set up a budget (as many as 350 categories) — and then compare your actual income and expenses to the budget.

Never forget a tax-deductible item. Today or at tax return time.

Display or print every financial report you'll ever need.



Record stock, bond and other investment transactions. Inventory household valuables, collectibles and important papers for insurance and other purposes.

Your Personal Net Worth works fast because it's in machine language. Documentation in plain English is referenced for easy use. "Help" functions on screen at all times.

Available for:

IBM-PC/XT/PCjr (128K)
Apple II+/IIe/IIc (64K)
Commodore 64
Atari (48K)
The Program comes with two disks, one of which has accounts already set up for entry. However, only one disk drive is necessary.

The Scarborough System.

You'll grow with us.

© 1984, Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, N Y 10591

CG-11-84

8	right
9	up and right
10	down and right
16	fire
17	up and fire
18	down and fire
20	left and fire
21	up, left, and fire (diagonally)
22	down, left, and fire (diagonally)
24	right and fire
25	up, right, and fire (diagonally)
26	down, right, and fire (diagonally)

For example, to test whether the fire button is being pressed on the joystick connected to port 2, you could use a line like the following:

```
IF PEEK(56320) AND 16 THEN PRINT "FIRE"
```

Mike Sudduth

Hot Drives

I often load a program or a game that I know will be played for hours. However, I don't like to leave the disk drive on because it might heat up. Is it safe to turn off the drive after it has finished loading the program?

Ilse Herrmann

Once a game is loaded, it's fine in most cases to turn off the disk drive. Of course, if the program you're running needs to access the disk, then it will have to be left on. Some games like Infocom's text adventures continuously use the disk drive while the game is in play.

If you are going to turn the drive off, be sure to remove the disk first.

Cursor Controls

I've discovered a technique for simple cursor control. In many of the programs I study, the cursor is positioned prior to printing with cursor control characters: {DOWN}, {LEFT}, etc. There is a much easier way to position the cursor. An added plus to this technique is that you don't need to know the current cursor position to move to the new position.

There is a Kernal routine called *PLOT* that can be accessed easily from BASIC or machine language. The subroutine (starting at address 65520) requires that the desired row number be placed in the X register and the desired column number in the Y register, and that the accumulator carry flag be cleared (set to 0). At first glance, this looks complicated, but the X and Y register values can be easily loaded from BASIC before calling this Kernal routine.

To set the registers, POKE memory locations 781–783. These bytes are arranged as follows:

Location	Register
781	X
782	Y
783	status register

To use the PLOT function, first POKE the registers with the desired row and column values. For example, if you wanted to print the word TEST starting at the sixth row down and the eleventh column over, you would: POKE 781,5: POKE 782,10. (Remember, the computer calls the top horizontal line of characters row 0, and the leftmost vertical line of characters column 0).

Next, the carry flag of the status register must be cleared. Bit 0 of the status register is the carry flag. When this bit has a value of zero, the carry flag is clear. To set the carry flag:

```
POKE 783,PEEK(783) OR 1
```

and to clear the flag:

```
POKE 783,PEEK(783) AND 254
```

Using the above example, the program to print TEST would look like:

```
10 POKE 783,PEEK(783)AND254:POKE 781,5:PO
   KE782,10:SYS65520:PRINT"TEST"
```

Jack K. Bonge

This can be a useful technique for simulating the PRINT@ (print at) statement common in other versions of BASIC, and will work on both the VIC and 64. Readers should remember to begin counting at zero. The upper-left corner is row zero, column zero, which is why you POKE a 5 to get row 6 and a 10 to get column 11.

Interfacing With The SX-64

I own a Commodore SX-64, and I have a Cardco interface and a Gemini printer. In the recent article, "Selecting a Printer Interface," you stated that interfaces which draw power from the cassette port will not work with the SX-64. This is correct, but with a soldering iron, a bit of solder and a joystick port connector (available at your local electronics store), you can remedy the problem quickly and easily.

First, remove the original connector designed to plug into the cassette port. Solder the end of the wire to pin 7 (see figure) of a joystick plug (*not* the joystick port of the SX-64), and cover the solder connection with electrical tape, or cover the back of the connector with a specially designed hood (also available at electronics stores). To power up the interface, simply insert the connector into the joystick port and turn on your computer.

Patrick Spence

This is a good solution. However, if you aren't experienced in electronics, consult a specialist. Be careful not to void your warranty. Also, some interface manufacturers claim there is insufficient current available from the joystick port to drive their interfaces. Contact the interface manufacturers

BREAKDANCE.™ BREAKIN' MADE EASY.

The hottest craze in the U.S. this fall is Breakdancing, and you don't have to miss it. Now anyone can Breakdance. Just grab your joystick and control your Breakdancer in poppin, punking, stretching and breaking...all on your computer screen.

Breakdance, the game, includes an action game in which your dancer tries to break through a gang of Breakers descending on him, a "simon-like" game where your dancer has to duplicate the steps of the computer-controlled dancer and the free-dance segment where you develop your own dance routines and the computer plays them back for you to see.

Learn to Breakdance today! Epyx makes it easy!

One player; joystick controlled.

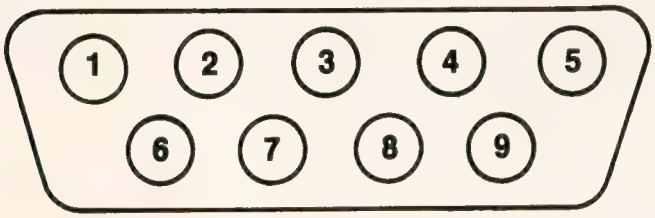
EPYX™ COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

for further information.

Also, see page 139 of the SX-64 User's Guide *for information on the joystick port. Readers should be sure not to use the original joystick plug connector.*

Joystick Plug (Rear View)



WordPro 3 Plus/64 Modification

We've received several letters regarding incompatibility between WordPro for the 64 and the Commodore 1526 printer. Professional Software, distributor of WordPro, has a fix and will send information on the modifications on request. Contact them at:

Professional Software Inc.
51 Fremont Street
Needham, MA 02194

8 GAMES PLUS...

The "PREMIER COLLECTION"
A disk packed full of games and other interesting programs for the Commodore 64. For all ages and interests. ALL for $34.95.

BULLRIDE. How long can you ride the wild bull in this fast animated computer simulation?

DARTS. Use a joystick to deflect darts toward the target. Scores like English Darts. 1-2 players.

EUCHRE. This solitaire version of the fast paced trump card game pits you against the computer.

MAXWELL'S DEMON. In this unique action game you must try to break the Second Law of Thermodynamics!

PHONE DIALER. A personal phone directory with automatic tone dialing. Stores 364 entries and 2 access codes per file.

REVERSI. 7 level machine language version of this familiar game. We bet you can't beat it on level 5!

SLIDE SHOW. Animated sequence of outer space scenes using the multi-color graphic mode.

SOPWITH CAMEL. Outfly the Red Baron and you'll win this one.

SQUABBLE. You have 3 minutes to find more words than the computer can find in the random 4x4 letter grid. The computer knows over 4,700 words. Do you?

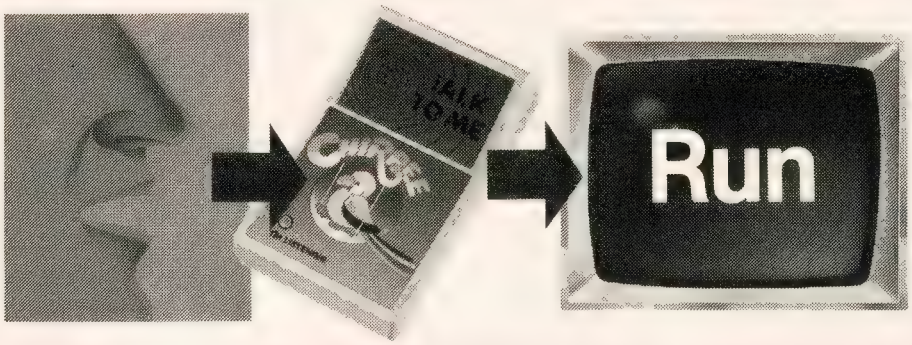
WORDTIME. If Squabble's too tame for you, try shooting missiles at letters to form words. 2 Players.

Commodore 64 is a registered trademark of Commodore Electronics Ltd.
(Works with most 1541 format Serial Drives)
Phone or Send $34.95 (OH. Res. add $1.93 tax) to:

THE SOFTWARE SECTOR, INC.
P.O. BOX 273
Bellbrook, OH 45305
(513) 848-2888

FINALLY, YOUR COMPUTER WILL DO WHAT YOU TELL IT.

Now anyone can use a computer.



Now everyone will use their computer more.

Introducing Chirpee™. The most affordable, most efficient computer voice command module ever developed.

Want your computer to do what you tell it? Talk to Chirpee. A patented phonetic-based system enables the revolutionary Chirpee voice command module to perform the same functions as units costing hundreds, even thousands of dollars more. Allows anyone to command a computer with just the spoken word. In fact, Chirpee is so easy to operate and so much fun to use, your computer will finally become the full-function tool it was intended to be.

Suggested Retail $179.95

Train Chirpee to understand your voice or several voices.

Chirpee is every bit as versatile as it is functional. Train it to obey your voice or several voices. Train it to understand any language on earth — from English to Swahili. All programming needed to put Chirpee to work is included with the voice command module.

- ☐ Voice recognition training and filing programs
- ☐ Challenging voice-activated games and easy "how to" demonstration programs
- ☐ Special program that converts each phonetic event into exciting CRT graphics

Major software houses are developing programs to enhance Chirpee's capabilities.

Patented phonetic voice activation system saves valuable user memory.

Chirpee is much more than a conversation piece. It is a product of six years of research and development. Chirpee is designed to be easy to use, highly functional and incredibly efficient. Operates in fast machine code and uses far less memory than more costly, conventional voice command modules.

ENG MFG., INC.
4304 W. Saturn Way
Chandler, AZ 85224
Phone 602/961-0165

For more information call toll free 1-800-431-3331 (effective 9-1-84) or 602-431-0400 for dealer location nearest you.

IMPOSSIBLE MISSION.™
YOUR MISSION–TO SAVE THE WORLD.

As a member of the exclusive Anti-Computer Terrorist Squad (ACT), your mission is to find and reach the infamous Elvin, who is holding the world's population hostage under threat of nuclear annihilation. You must negotiate a path through the rooms and tunnels of his headquarters trying to avoid Elvin's robot protectors.

Should you try to outrun or jump over the next robot or play it safe and take the time to assemble the codes needed to deactivate the robots and then to find and stop Elvin.

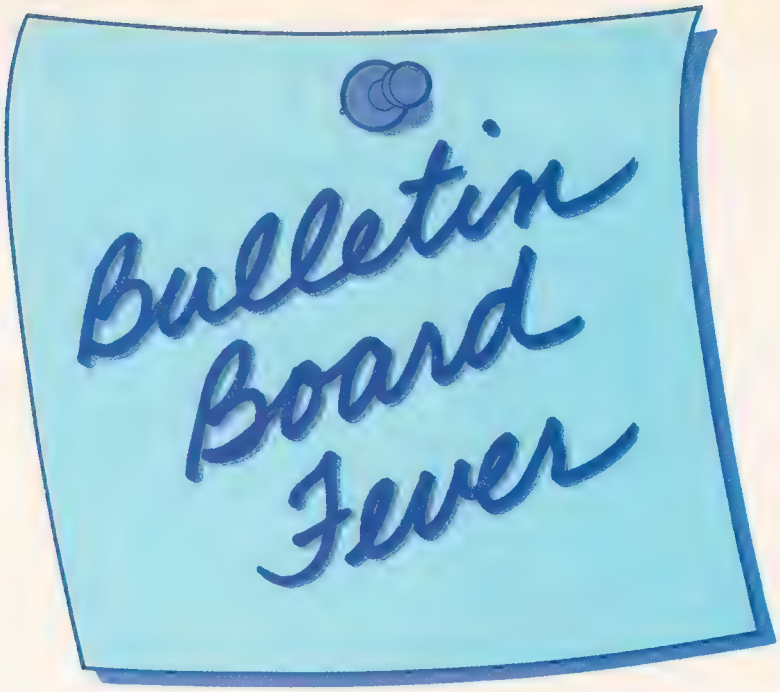
Use your camera to photograph as many clues as possible to find the password which will allow you to penetrate Elvin's control room.

Your Mission—To Save The World, But Hurry!

One player; joystick controlled.

EPYX™ COMPUTER SOFTWARE

Strategy Games for the Action-Game Player



Kathy Yakal, Editorial Assistant

Get used to hearing busy signals: Telecommunications networks are tied up a lot these days. And bulletin board systems specifically designed for Commodore owners are popping up daily around the world. Here's a look at what's happening.

A modem is a rather unremarkable-looking piece of equipment. Plastic housing, maybe a couple of lights or switches, occasionally a wire or cable attached to one end. Nothing magical.

But when you connect it to your computer and dial certain phone numbers, remarkable things do happen. *Telecommunications networks* offer help with technical problems, up-to-date news, movie reviews, public domain software, shopping catalogs, and, sometimes, new friends.

CompuServe and The Source are probably two of the best-known national networks. They are *multi-user systems* which can be used by more than one caller at a time. They charge a subscription fee and an hourly on-line charge. Most large cities (population of 50,000+) have a local number, so you can avoid long-distance charges.

Of course, you don't have to call an established telecommunications service to communicate with your modem. If you and a friend each have modems, you can call each other and "type" to each other, or send software, instead of talking. Though that can be fun for a while, the novelty soon wears off (and the phone bills add up if it's long- distance).

Another telecommunications alternative that's fast gaining popularity is the bulletin board system (BBS). Some of the original boards went on-line in the late seventies, and were run by computer user group members. They were used primarily for posting messages.

Over the past year, BBSs aimed specifically at Commodore owners have popped up all over the country—even in many foreign countries.

It's not hard to see why they call them electronic bulletin board systems. Think of what you most often see tacked up on regular bulletin boards. Notices of time and place for upcoming meetings. Items wanted, or items available for sale or swap. Funny cartoons or articles clipped out of newspapers and magazines. People needing assistance of some sort.

That's the kind of interaction you'll find on Commodore bulletin boards. Only your interaction won't be limited to the bulletin board hanging at the laundromat or on the office wall: You'll have access to people literally all over the world.

Let's walk through your first call to a BBS. Once you've received an answer and a terminal tone, and answered with your own, you'll probably see a message welcoming you. If nothing happens in the first ten seconds or so, try hitting the RETURN key a couple of times. Some systems require you to give them a couple of carriage returns to signal the software that someone is on-line.

After the welcome message and maybe a couple of bulletins from the *system operator* (sysop),

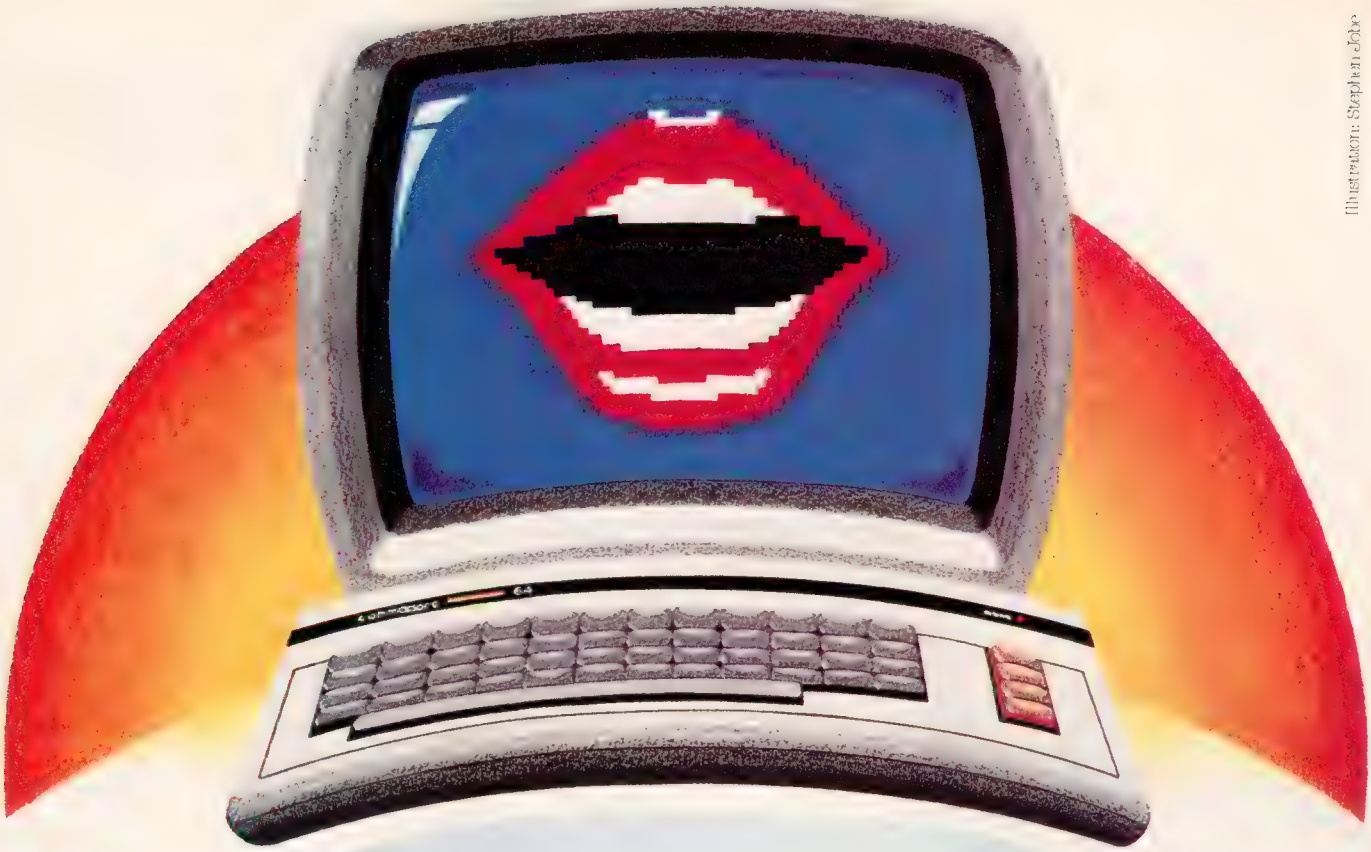


Illustration: Stephen Joke

Not just all talk.

Add Speech to your Commodore 64™ today!

With the POWER of **The Voice Messenger's™** infinite vocabulary, your Commodore 64 can say any letter, word or sentence. Simply!

Just for fun... or as an educational tool.

Best of all, it's simple to program your C-64 to leave all sorts of talking messages.

Just think of the possibilities!

A message to your family! A secret for your best friend! Or even a reminder for yourself to feed the fish!

The Voice Messenger features: ▪ Infinite vocabulary ▪ One BASIC command "SAY" provides easy programming of whole sentences ▪ Two voices and intonation—add character and excitement ▪ Built-in software—nothing extra to buy ▪ Installs instantly—Two simple connections ▪ Clear, easy to understand speech ▪ Doesn't steal RAM from BASIC workspace ▪ Won't stop screen action.

Add new life to your Commodore 64 with The Voice Messenger! Ask for The Voice Messenger at your local Commodore dealer, or call TOLL-FREE 1-800-443-0100 ext. 797 to place your order now!

The Voice Messenger–Speech 64

For more information contact:

currah
TECHNOLOGY
Speaking For Consumer Electronics

Price Breakthrough:
Only $49.95
No Extras!

50 Milk St. 15th floor, Boston, MA 02109 (617) 357-8084 TELEX: 951131 HQ BSN
Currah Computor Components Ltd. Reg. No. 1555490, U.K. Graythorp Industrial Estate, Hartlepool, Cleveland, U.K. Telex 58127 CURRAH G

Commodore 64 is a trademark of Commodore Electronics Ltd.

On the road to Discove

Your child is on the road to the future and ChallengeWare can help him discover new and exciting information along the way. With colorful graphics and presentations, ChallengeWare can help him to improve practical learning skills as well as enhance his creative thought process. It will strengthen his knowledge of subjects learned in class and introduce him to a world of new concepts.

ChallengeWare is the new series of educational programs available for the first time for home use through Orbyte Software. Currently used to improve the educational quality of over 1,000 schools systems across the United States, ChallengeWare offers a distinct difference in home education...the academic material taught through this series has been tested, approved, and recommended by your child's teachers!

A wide variety of topics, quality material, performance evaluations, and immediate positive reinforcement for correct responses are several of the exceptional features offered and acclaimed in this series. And, ChallengeWare grows as your child does. Beginning with basic pre-school concepts and progressing to mathematics, grammar, reading, social

For Commodore 64 and Apple II series.

Commodore is a registered trademark of Commodore Business Machines
Apple is a registered trademark of Apple Computer Products

y with...ChallengeWare™

studies, science, foreign language, economics, computer programming, and logic and strategy, ChallengeWare will follow him from the early formative years until adulthood. A total of 55 titles in all to keep your child's interest peaked with new and exciting information!

Now you can play an active role in your child's future achievement by starting him off with ChallengeWare.

For a dealer nearest you, call TOLL FREE 1-800-253-2600.

ChallengeWare™

ORBYTE™ SOFTWARE

Box 948, Waterbury, CT 06720 (203)621-9361

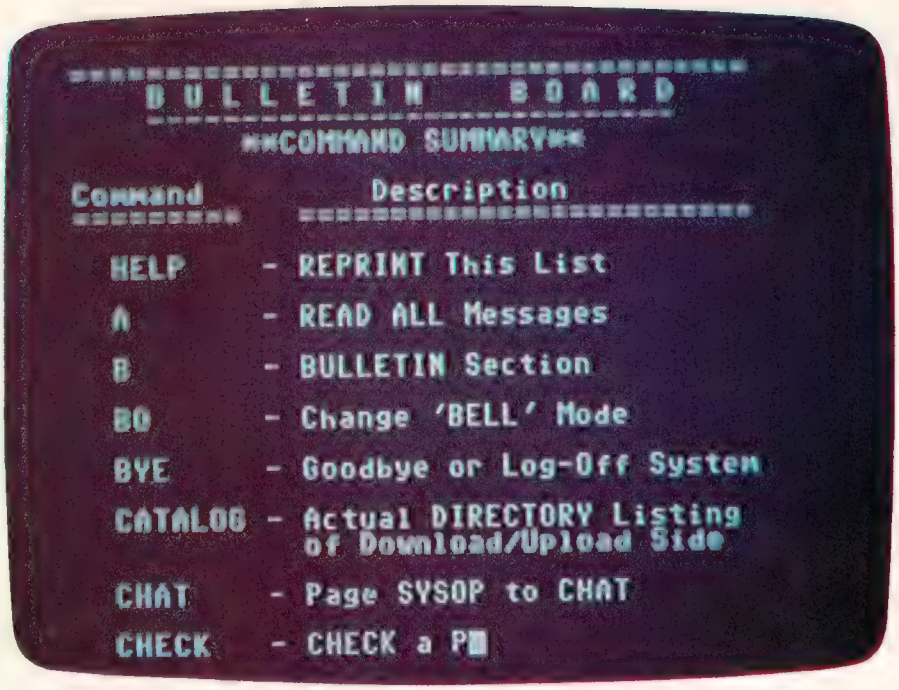
you'll be asked for your name and the city and state you're calling from. You may also be required to make up a password you'll have to remember and use each time you call. This insures that no one can post fake messages using your name. Make sure you write down your password.

Because of the tremendous number of calls that BBSs get, and the tendency of some users to try to crash boards, you may get no farther than this. Many Commodore bulletin boards have been forced to go private in the last year or two. If this is the case, you'll be given an address and/or telephone number to call to inquire about gaining access to the board. Some require modest membership fees, others just want more information about you.

In any case, have a piece of paper and pencil handy. Once the system's menus come rolling by, you may want to take notes, though most systems offer commands that let you stop the action for awhile. Watch for a message that says something like, "Hit S to pause. Once paused, hit S to restart, A to abort." Remember those commands. You'll want to use them once you've become familiar with a BBS and to skip over the opening bulletins.

Command level is where things start happening. You reach this level when all of the sign-on procedures and opening bulletins are completed and the BBS software wants to know what you'd like to see.

It's a good idea to *download* a system's main menu and print out a copy of it (though you must have software that allows downloading to do that). You'll probably become familiar enough with the features that you use most often to remember the commands, but you may also be missing out on some other features.



This is a partial listing of the commands available on Commodore Communications, *a Commodore BBS located in St. Louis.*

Once you've chosen a command and entered it (usually just one or two letters), the system will give you instructions on how to proceed. For example, if you want to enter a message to an individual or for everyone to read, it will prompt you all the way through the process, then give you options to edit or abort the message if you've made a mistake. (If you're brand new to the board, you may have restricted access—allowed to read messages but not leave any—until you sign up as a member.) Most bulletin board systems are user-friendly, as long as you stay alert for command menus and prompts.

Try to complete your business as soon as possible. Bulletin boards are not multi-user systems: While you're on-line, everyone else trying to call is getting busy signals.

One of the commands you must remember is the one to log off. Most often, it's G (goodbye), Q (quit), or just OFF. If you disconnect your modem without first logging off the system, it will take longer for the next person to gain access. You may even wreak some havoc with the BBS software. Some bulletin boards will automatically log you off if there is no activity for five (or ten or fifteen) minutes. If the board is very popular, the sysop may decide to limit calls to thirty minutes per person per day, to prevent callers from monopolizing board time.

The two most common uses of Commodore bulletin board systems, say many sysops, are *electronic mail* and program *downloading*.

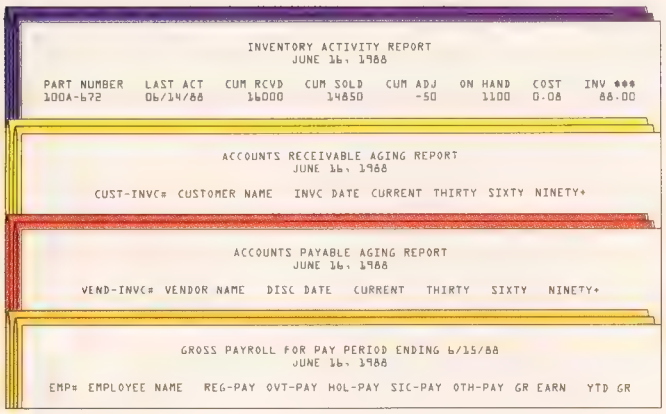
Users leave messages about all kinds of things: selling or trading equipment, advice on what kind of software to buy, questions about technical problems, opinions about movies and books and TV personalities, and even debate about political issues. Some of the debates get so heated, in fact, that the sysop will occasionally intervene and put an end to the discussion.

Besides the public forum that electronic mail provides for all to see, a lot of messages are sent privately on BBSs. (You're always given this option when entering a message.)

WHO'S GOT 7 NEW BUSINESS SYSTEMS FOR ME? TIMEWORKS.

Here's a series of seven easy-to-use Management Information Reports flexibly designed to accommodate all small and medium size business accounting requirements for Commodore 64* computers.

Inventory Management / Sales Analysis Management / Accounts Receivable Management and Invoicing / Accounts Payable Management and Checkwriting / Payroll Management / Cash Flow Management / General Ledger



INVENTORY ACTIVITY REPORT
JUNE 16, 1988

PART NUMBER	LAST ACT	CUM RCVD	CUM SOLD	CUM ADJ	ON HAND	COST	INV ***
100A-672	06/14/88	16000	14850	-50	1100	0.08	88.00

ACCOUNTS RECEIVABLE AGING REPORT
JUNE 16, 1988

CUST-INVC#	CUSTOMER NAME	INVC DATE	CURRENT	THIRTY	SIXTY	NINETY+

ACCOUNTS PAYABLE AGING REPORT
JUNE 16, 1988

VEND-INVC#	VENDOR NAME	DISC DATE	CURRENT	THIRTY	SIXTY	NINETY+

GROSS PAYROLL FOR PAY PERIOD ENDING 6/15/88
JUNE 16, 1988

EMP#	EMPLOYEE NAME	REG-PAY	OVT-PAY	HOL-PAY	SIC-PAY	OTH-PAY	GR EARN	YTD GR

General Overview

Each system includes:

A Menu-driven program, sophisticated enough to provide complete Management and Product information, yet requires no prior computer or accounting knowledge to operate.

A unique method of creating your own, unlimited array of reports — easily and quickly. YOU select the information you want, and YOU determine the sequence of the report column headings.

A program which can be used by itself (standalone), or can be interfaced, one at a time, with other TIMEWORKS MANAGEMENT INFORMATION programs into a fully integrated accounting system.

A Manual written in easy-to-understand, people-friendly English, abundantly illustrated to provide further clarity and eliminate guesswork.

Password Protection, to prevent unauthorized access to confidential data.

Suggested Retail List at $59.95 each.

Customer Support Plan

Timeworks Telephone Consulting Service is available to all users at no charge to support your installation and ongoing operations.

For further details, contact your local Dealer or Timeworks, Inc. Choose from a host of Commodore 64 programs. Now at your favorite dealer. Or, contact Timeworks, P.O. Box 321, Deerfield, IL 60015. 312-291-9200.

TIMEWORKS

SOFTWARE WITH SUBSTANCE — FOR EVERYONE.

*Registered Trademark of Commodore Computer Systems. © 1983 Timeworks, Inc. All rights reserved.

Take our educat
home. And be a

America's schools need your help!

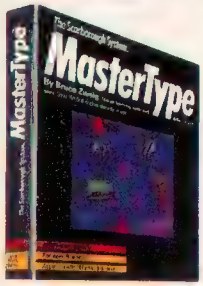
The publishers of America's number one educational program make you this unusual offer: Take any of our educational programs home and be a hero once, because kids love the fun we bring to learning. As a bonus we'll send the program of your choice to your school, free, including a gift card in your name. You'll help meet the acute need for superior software in our schools. You'll be a hero twice!**

The Scarborough System has a complete range of programs to stimulate, challenge and help you or your children be more productive—including Your Personal Net Worth, that makes handling home finances fast and easy, Make Millions, an adult business simulation game, and PictureWriter,* a program that makes drawing on the computer fun. At your dealer's now.

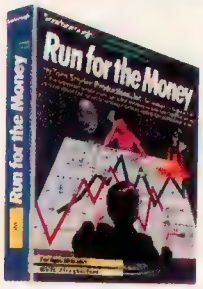
The Scarborough

©Scarborough Systems, Inc., 25 N. Broadway, Tarrytown, New York 10591

ional software hero twice!



MasterType™* Sharpen typing skills and increase computer facility. MasterType is the nation's best-selling educational program. It's an entertaining game that teaches typing as it increases the keyboard skills needed to be at home with a computer. And there's a bonus on top of this bonus: when we send a copy to your local school, at your request, your child will become even more proficient with a computer.



Run for the Money™ Learn to pursue profits in the real world by escaping from an alien planet. Here's an excitingly different, action-packed game of business strategy for two players. Your children will have fun as they learn a lot about business.

Phi Beta Filer™* New for children and adults. Organizes lists of addresses, dates, insurance and medical records, hobbies and collections—even school work—structures quizzes on any subject, quickly and easily. (Not available for Atari.)

Songwriter™* Kids and adults will love making music at the computer. Just press a key to listen, press a key to record, and you've started your own composition. It's a fun way to learn about music. And Songwriter can be played through your stereo or computer.

*National Education Association Teacher Certified Software.

MasterType
Phi Beta Filer
BOOK OF THE MONTH CLUB GUIDE BEST COMPUTER BOOKS & SOFTWARE

PatternMaker.™ An amazing software program. It's geometry. It's art. It's great fun. Kids can build dazzling patterns and learn a lot. PatternMaker builds a foundation that can be applied to many professions and crafts. It challenges creativity and effectively teaches symmetry, color and design, and it's just as much fun for grown-ups, too.

Our programs are available for: IBM-PC/PCjr, Apple II family, Commodore 64, Atari.

You'll grow with us.

System.

Yes! I want to software a school!

**Enclosed is the completed warranty card and sales receipt for the purchase of a Scarborough product. I am enclosing my check for $3.50 to cover handling, shipping and postage required to send a free copy of a Scarborough program to the school listed below. A gift card with my name will be enclosed.

Your Name (for gift card) _____

Name of Principal _____

Name of School _____

Address (school address only) _____

City _____ State _____ Zip _____

Software will be sent only to verifiable school addresses.

Offer Expires Dec. 15, 1984

Check computer used in school:
☐ Comm. 64 ☐ Atari ☐ Apple II family ☐ IBM

Check product to be sent to school:
☐ MasterType ☐ Songwriter ☐ Phi Beta Filer
☐ PatternMaker ☐ PictureWriter† ☐ Run for the Money

† Apple only.

Make check payable and mail to:
Scarborough Systems, 25 N. Broadway, Tarrytown, N.Y. 10591

CG-11-84

The Indispensable Sysop

Kathy Yakal, Editorial Assistant

For one sysop, starting a bulletin board system was a leisure-time hobby, an entertaining way to learn about computers. For another, it was an important factor in recovering from a decade of serious illness. Tony Ott and Bob Shannon tell contrasting stories about their histories as sysops and authors of BBS software.

A good way to learn something, it's often said, is to teach it to someone else. In order to explain a concept, you must understand it much more fully than if you were just trying to understand it yourself.

Tony Ott had such a theory when he decided to start a Commodore bulletin board system over two years ago. "By establishing a BBS, I thought I would triple my learning time about computers," he says. "The board has done that."

Ott, who travels frequently in his job as a management consultant, runs the BBS from his St. Louis home in his spare time. He has written several telecommunications-oriented programs which are in the public domain, and recently completed a software program for BBSs that runs on the Commodore 64. He plans to market that, as well as set up a second board using it.

Ott went on-line in the pre-Commodore 64 days, when only PETs and VIC-20s were available. "Initially, one had to be somewhat wealthy to set up a Commodore system," he says. "CBMs were still selling at $1795, 4040s and 8050s [disk drives] were $1795, and the IEEE modem cost $395.

"Then you had to build your own auto-answer circuit, which was another $75–$100. That's a tidy sum, but it was really worth it. It's an amazing learning tool for someone who's really serious about it."

During the last year or so, it's become possible to start a BBS using only a Commodore 64 or VIC-20, a 1541 disk drive, an auto-answer modem, and BBS software. "There are at least 50 BBS programs in the public domain, but they all have enormous problems," says Ott.

Which may be one reason why so many boards perish quickly. Several systems have gone on-line and disappeared, the victims of inadequate software, equipment failures, lack of funds to maintain two phone lines (one for the BBS, one for personal use), or pranksters bent on crashing boards. Ott uses Steve Punter's BBS software, modified for his own use.

Some bulletin board systems store hundreds of *public domain* programs, software that is not copyrighted and can be shared freely. Users are encouraged to upload public domain programs, or programs they have written themselves. Sysops will often put a limit on the number of programs you can download without having uploaded some already, just to keep the program disks full.

Other common features include:

**Bulletins*. News about the latest Commodore hardware and software products; information about user group meetings; miscellaneous industry news.

**Delete* a message or program you uploaded.

**Expert Mode*. Lets you skip over new user information, explanations, and menus.

**System Usage Log*. Gives you a list of who has been using the system.

**Summary of Available Messages*. Lets you scan over message headings and only read the ones you want.

**Other BBS numbers*. Lists telephone numbers of other bulletin board systems. This is the most up-to-date way of finding other BBSs to call.

**Chat Mode*. Allows you to "chat" on-line with the sysop (if he or she is available).

You might wonder what's on the other end of the line when you call a bulletin board system. Occasionally it's the back room of a computer store, but often, it's an individual's living room or bedroom. Usually, the sysop is a Commodore dealer or a user group member.

The hardware that runs the BBS may be no more complicated than your own set-up. All you need to start a BBS is a computer, disk drive, monitor, auto-answer modem, BBS software—and a lot of time and patience. Sysops spend anywhere

Get more out of your new Commodore. Get Star's Gemini-10X personal printer.

"My Commodore* computer really helps with my marketing business. It does just about everything but type and lick envelopes. Which would be nice for all my direct mail.

"Well, my Gemini printer solves the typing problem. And it's made to connect right to my Commodore.

"I've used it for typesetting ads and even printing letters. The type is the most solid dot matrix I've ever seen.

"And it's great having both Commodore and Gemini graphics to play with. I've even designed my own logo.

"Buying the Gemini-10X was a good move. It made my Commodore a better computer."

Steven Clarke—San Francisco, California

With Star's Gemini-10X printer you get 120 characters per second of clean, crisp type, multi-function versatility and steady, dependable service. All at a price that works.

It's everything you need in one printer.

*Commodore is a registered trademark of Commodore Business Machines, Inc

star micronics·inc

THE POWER BEHIND THE PRINTED WORD.

200 Park Avenue • New York, NY 10166

Dallas, TX (214) 456-0052 • Boston, MA (617) 329-8560

Chicago, IL (312) 773-3717 • Irvine, CA (714) 768-4340

The biggest problem with being a sysop, according to Ott, is lack of time. "It's an enormous responsibility," he says. "I get from ten to twenty-five messages a day, addressed to me, people wanting help." And the only way he can get logged onto the BBS to answer those questions is by auto-dialing the system from another computer in his home.

Beyond that, he has received thousands of letters over the last several months, as well as a steady stream of phone calls. "There was a period there when my phone bill was running about $400 a month, just from returning calls to people who had questions," he says.

Why his BBS's activity picked up so dramatically last fall and hasn't stopped yet is a mystery to Tony Ott. "I kind of wish I could bring back the old days sometimes. It loses the personal touch when there are so many people," he says. Ott's board averages around 70 calls per day, with callers staying on for 10 to 20 minutes.

Though the personality of his BBS hasn't changed, the age of the callers has. "The old PET-CBM people—the ones that bought the old 8K PETs—still call, but they're in the minority today," he says. "Most of the activity is with youngsters."

Nor has Ott's role as sysop changed. "I'm still doing the same thing now as I was two years ago, providing a lot of information and answering a lot of questions.

"There's something mystical about this, and I don't know why. I think it's sort of a security blanket to a lot of people in small towns that call because they don't have a dealer in their town and there isn't even a K-mart for a hundred miles. They know that if I don't know the answer, that someone I come into contact with over a week's period of time will know it."

For the present, Ott considers his work with bulletin boards and software a hobby, though it certainly could be a full-time job. "It's really a release from my high-pressure job," he says.

"Beyond that, the consistency of staying on-line and growing is a big thing. So many boards come and go. I'm just enthralled and fascinated by it now."

Halfway across the country from Tony Ott, Bob Shannon lives and works in a house on the beach near Fort Bragg, California, about 150 miles north of San Francisco. He's the sysop of *Electric Magazine*, a BBS designed in a magazine format. Callers can get updates on local news, read and leave messages, and read columns on a number of topics.

from 2 to 20 hours a week on board maintenance, doing things like answering mail, deleting outdated messages, updating bulletins, and modifying software.

Why do they do it? Toronto resident Steve Punter, author of the *WordPro* word processing package and one of the longest-running Commodore sysops, says he's always had a fascination with communication. "Computers are another way of communicating," he says. "And being at the center of a communications network like a bulletin board is fascinating.

"People think that running a board is simple. They soon find out that it's a lot of work."

Another sysop, 14-year-old Matt Peterson, of San Francisco, found that out when someone crashed his board and destroyed his software. He's trying to reconstruct the program, feature by feature. It's slow going.

But it's better than a $100 phone bill every month, which is what prompted Peterson to start his own BBS. "I wanted to have people start calling me instead of having to call them," he says.

Many user groups start BBSs as a service to their members, instead of, or in addition to, a monthly newsletter. Some, like the Commodore Club of Augusta, Georgia, have equipment donated to them or get it at wholesale cost. Club president David Dumas says that having a bulletin board system simplified the task of distributing public domain software to club members.

Tim Renshaw, a Commodore dealer in Indianapolis, was simply intrigued by the idea of bulletin boards. He had been calling an Apple board in the area, then found out that Steve Punter had written a BBS program for Commodore computers. Renshaw's BBS went

Tomorrow I've got to get ORGANIZED!

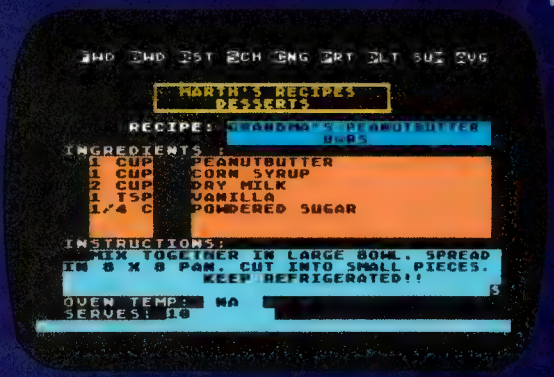
MicroFiler™

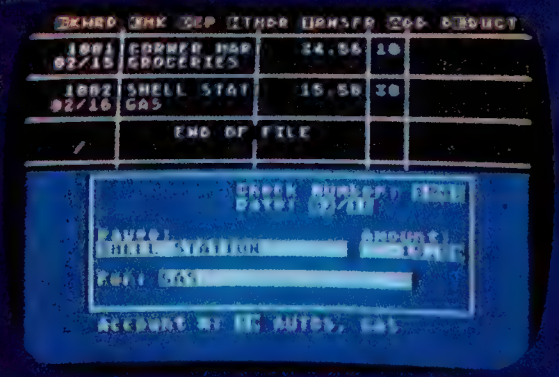
Get rid of your paper clutter...any kind of file...name and address files...membership lists...the "list of lists" is endless! Insert the MicroFiler cartridge into your computer, set up the desired format, and type merrily away. MicroFiler doesn't just store data. You can search for specific entries quickly and easily, sort or alphabetize entire files, add, subtract, or find averages of numeric information. MicroFiler will also work with a printer, letting you make labels and print lists. A very practical program that turns your computer into a tool, not a toy!

Only $49.95 Each

MicroCheck™

Enjoy the convenience of an electronic checkbook, maintained just like a regular checkbook. Graphics are designed to resemble standard checks, deposit slips, check recorder, and other forms with which you are familiar. MicroCheck can handle as many as 30 different budget accounts, allows for transfers from one account to another, and maintains a continuous balance for each. Reviewing your entries is a simple matter of scrolling forward or backwards through the check recorder, and reports can be either displayed on the screen or printed. A very practical program!





Practical Software for Atari and Commodore 64

- Truly practical home management programs
- Works with tape or disk
- Simple to learn
- Easy to use cartridge

MICROBITS PERIPHERAL PRODUCTS

225 Third Avenue SW Albany, Oregon 97321 (503) 967-9075

Atari and Commodore 64 are trademarks of Atari Inc. and Commodore Electronics LTD respectively. Copyright 1984 by Microbits Peripheral Products Inc. All rights reserved.

Shannon has sold his BBS software to almost 400 people, and keeps in close contact with his sysops through phone calls and a monthly newsletter. He charges $39.95 for the software, unless it's requested by someone who plans to use it for communications between the handicapped. His most recent donation went to a group in Israel, who plan to translate it into Hebrew and set up a BBS for the deaf.

"Because it's so much fun, I probably spend more time on upkeep of the board than most sysops do," says Shannon. "It's fun because of the contact with people, and because I'm making enough money to start my own little business."

Five years ago, Shannon wasn't even able to consider such things. Severely brain-damaged from an industrial accident in the late sixties, he was confined to his home for ten years.

Thanks to advances in psychiatric medication, Shannon started to recover a few years ago. He bought a Commodore 64 and began teaching himself to program. "I had read Toffler's *The Third Wave* about three years ago, and remembered how he talked about new entrepreneurships with home computers," he says. Shannon began to wonder if he could do something with computers that was fulfilling and profitable.

He contacted the State Department of Rehabilitation, which told him about a program called PASS (Plan to Achieve Self-Support). By enrolling in it, he could still receive his Social Security disability pay for three years while trying to start a business.

Shannon had logged on to a number of bulletin board systems, and was intrigued by the idea of writing his own. He wrote his own program in about two weeks and went on-line last November using a Commodore 64, a 1541 disk drive (which has run perfectly ever since), and an auto-answer modem.

His BBS software has sold so well, he thinks, "because it's a 14K BASIC program, very easy to tailor. I think its simplicity is kind of a selling point. The board can develop the personality of the sysop. You could look at my boards running all over the country and they don't look at all like mine."

With the money he's made from the sale of his program, Shannon is in the process of setting up his own software store in Fort Bragg. But he has no plans to abandon the *Electric Magazine*, or the daily contact he has with his sysops. "After so many years of disability, it's terribly enjoyable."

on-line August 11, 1982, and has been running ever since.

Sysops report a dramatic increase in activity on their bulletin board systems in the last year. Five calls a day have grown to 75. Message sections of the boards, which used to have months-old mail on them, now have to be cleaned out weekly. More women are calling. Public messages, which used to be all computer-related, have turned to all kinds of topics.

Such a jump has to be related, in part, to increased modem sales. Tim Renshaw thinks the movie *War Games* had a lot to do with that. "That movie opened up a whole new world for people who had computers and didn't know what modems are all about," he says.

But there's another reason, believes Renshaw. "In one light, it's kind of taken the place of CB radio. It's a chance for people to chat with each other and maintain a little bit of anonymity," he says.

Matt Peterson agrees. "You can say what you want without people knowing who you are."

Telephone numbers for BBSs mentioned here (all are operational 24 hours a day unless noted):

AVC Commodore Bulletin Board
(Tim Renshaw, sysop)
(317) 898-5027

Commodore Club of Augusta
(David Dumas, sysop)
(404) 863-7733

Commodore Communications
(Tony Ott, sysop)
(314) 867-6950

The Electric Magazine
(Bob Shannon, sysop)
(707) 964-7114

PSI-Word Pro
(Steve Punter, sysop)
(416) 624-5431
(M-F, 6 p.m.–8 a.m.;
24 hours on weekends)

Unlimited Free Programs - Unlimited Fun!

With VIP Terminal™

A Powerful 80 Column Communication Program!

VIP Terminal is what you need to talk to the world! Communicate with friends, work, school, bulletin boards, even information services like CompuServe. Share programs, news, pictures, stock quotes - anything in writing. With your C64, any modem and VIP Terminal, you can master the information revolution — professionally!

VIP Terminal is power packed to get the job done! It features a professional 80 column display (40, 64 & 106 columns too!) to bring your C64 up to the industry standard - without any hardware modification! It works with all popular modems, and, with those that allow it, VIP Terminal will auto dial, and redial if the line is busy. It also will auto answer - even take messages! Of course you can send and receive programs and the like. And you can print what is coming on the screen. It has a 16-entry phone book for those often used numbers, and a 20-entry message file for frequently sent messages. It also has a powerful editor so that you can write messages to send later, or edit ones you have received. You can even save and use files as large as your disk!

VIP Terminal Is Easy and Fun to Use!

VIP Terminal makes full use of the potential of your C64 - you get color, graphics and sound. VIP Terminal uses menus and "icons," pictures of the tasks to be done. In fact, VIP Terminal can almost be totally controlled with a joystick. You can switch menus, change screen colors, change parameters, even dial your phone without ever touching your keyboard! Just move the hand to point to the colored icon, or the entry, press the fire button, and the change is made. Of course, it all can be done from the keyboard too!

Help is built right into the program so you can't get lost or confused. The manual is even capsulized on the disk for reference from the program when you need it. VIP Terminal also has a chiming clock for the quarter hour and the hour, and an alarm you can set. There's even a musical alarm to let you know when you have a call. VIP Terminal has put it all together to make the perfect communication program!

Integration With VIP Desktop

VIP Terminal is connected to the whole VIP Library™ of programs through VIP Desktop™. From VIP Desktop, you may access any of the other VIP Library programs that you own. The rest of VIP Library will meet your word processing, financial planning, data management and other essential home and business information management needs. All VIP Library programs feature high resolution graphics to give 80 columns on the screen without any hardware modification. They also give you icons and plenty of help. Quality and affordability are our number one concern!

VIP Terminal ONLY $59.95

Available at Dealers everywhere. If your Dealer is out of stock ORDER DIRECT!

1-800-328-2737

Order Status and Software Questions call (805) 968-4364

MAIL ORDERS: Shipping: $3.00 U.S.; $5.00 CANADA; $15.00 OVERSEAS; Personal checks allow 3 weeks.

SoftLaw

132 Aero Camino
Goleta, California 93117

A Buyer's Guide To Modems

Sharon Darling, Research Assistant

Telecommunicating with other users, data bases, information networks, bulletin boards, and buying services opens up a fascinating world of possibilities. All you need is a modem, but there's a variety to choose from, with a wide range of prices and features. Here's a look at what's available for Commodore users.

Talking to other computers, whether they're across town or across the world, is easy. All it takes is a computer, a telephone, a *modem*, and a *terminal software program*.

A modem (MOdulator-DEModulator) simply translates the numeric digital data from your computer into analog signals (which sound like high-pitched whistles) that can be carried by your telephone. Another modem then reverses the conversion at the receiving end. Terminal software is the program that tells your computer *how* to talk with other computers.

Although modems are primarily signal converters and translators, there are numerous features which bear individual consideration. Modems range in capabilities from the quite simple to the complex. Before buying one, you must decide which features are important to you, and how much you're willing to spend for those extras.

Compatibility is the first thing to be concerned with when modem shopping. The modem you buy must be capable of working on your computer.

That's a little trickier than it sounds, where the Commodore 64 and VIC-20 are concerned. While many modems are equipped with an RS-232 interface, and your Commodore computer has an RS-232 port on the back, it's not as simple as plugging it in.

The Commodore RS-232 port is not compatible with the industry standard RS-232, so unless a modem is designed to work specifically with the 64 or VIC, you'll need an adapter (available from Commodore) to make it work.

Your next consideration should be what kind of phone system you have. Telephone lines are incapable of transmitting the digital bips and beeps sent out by computers, so, again, compatibility is a factor. On some modems, the special features such as automatic dialing will work only with touch tone telephones, while others will work with either pulse (rotary) or touch tone models. Check before you buy to see what kind you need.

Connectors are available to convert your phone's signal to one that will work with the modem you want to buy, should you have your heart set on a particular brand.

Price becomes a consideration when deciding whether you want a *direct-connect* or *acoustic* modem.

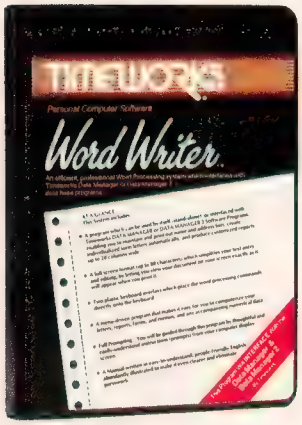
With acoustic modems, which are generally less expensive than direct-connect models, you place the handset of your telephone into soft rubber cups on the modem. One of the cups contains a speaker, which generates audio tones, while the other cup acts as a microphone to receive tones from the other modem.

While you'll save money with this kind of modem, you'll probably sacrifice some quality, as the connection generally is not as good as with a direct-connect modem. And room noises can interfere if the phone handset is not sealed tightly in the cups.

With direct-connect models, the modem plugs directly into the telephone through a modular phone jack. Some direct-connect modems, such as the VICmodem, are cartridges that plug into a port on the computer.

Still other models are stand-alone units that can be placed directly underneath the phone and plugged in.

IF YOU CAN FIND A BETTER WORD PROCESSOR OR DATA BASE SYSTEM WE'LL BUY IT FOR YOU.



Outrageous offer? Not really. For your Commodore 64, we're putting our money where our mouth is, because the Timeworks Word Writer and Timeworks Data Manager 2 are so complete—so extremely easy to use, we think nothing beats them at any price. (Our suggested retail prices are: $49.95 for Word Writer. $49.95 for Data Manager 2.)

Word Writer

This menu-driven system includes:

A program which can be used by itself (stand-alone), or interfaced with Timeworks' Data Manager or Data Manager 2, enabling you to maintain and print out name and address lists, create individualized form letters automatically, and produce customized reports up to 20 columns wide, which can be incorporated into any text produced by the Word Writer.

Two plastic keyboard overlays which place the word processing commands directly onto the keyboard.

A full screen format (up to 80 characters) which simplifies your text entry and editing.

All the essential features—plus some exclusive Timeworks extras—making this system completely functional for most home & business requirements.

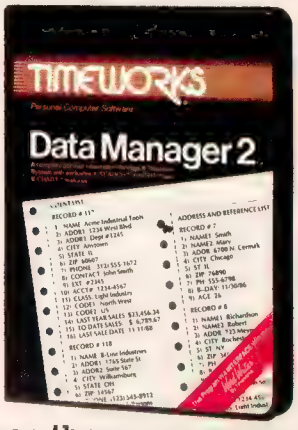
Data Manager 2

This system includes:

A menu-driven program that easily lets you store information on a wide variety of subjects—from general name and address lists, to research data. This program will also calculate and store any corresponding numerical data.

Quick access to important information. Items can be easily retrieved and printed by category, name, index code, date range, amount range, or any category of information stored in the system.

Timeworks exclusive X-Search,™ X-Sort™ and X-Chart™ features allow you to easily cross-search any of the categories. Or arrange your stored items in increasing or decreasing order, alphabetically, numerically or by date. Break down statistical information by up to ten indexed categories of your choice—and graphically review your results.



Arithmetic calculation of your mathematical data is possible, allowing you to perform Payroll calculation, cost estimates and more. Data Manager 2 also produces the Sum, Average and Standard Deviation of statistical data entered into the system, along with Frequency Charts.

When interfaced together, these programs:

Generate customized data reports, which can be incorporated into any written text produced.

Individually address and print form letters automatically.

Print your name and address file onto standard mailing labels.

Transfer and print text information onto labels and tags.

Calculated numerical data from column to column, giving these programs spread-sheet capabilities.

So, if you can find anything better, simply send us your Word Writer or your Data Manager 2, your paid receipt, and the name of the program you want, along with your check or money order for any price difference. If it's available, we'll buy it for you.**

Now at your favorite dealer. Or contact Timeworks, Inc., P.O. Box 321, Deerfield, IL 60015. Phone 312-948-9200.

TIMEWORKS

SOFTWARE WITH SUBSTANCE.

**Now for the small print. Offer applies to Commodore only, with maximum suggested retail prices of $125.00 each for any exchanged program. Offer expires 45 days after date of your purchase.

*Registered Trademark of Commodore Computer Systems © 1983 Timeworks, Inc. All rights reserved.

A Buyer's Guide To Modems

Modem	Manufacturer/ Distributor	Compatibility	Interface Required?	Communication Standard	Coupling Method	Baud Rate	Duplexing	Auto-Answer	Auto-Originate	Self-Test	Carrier Detection Indicator	Power Supply	Cables/ Connectors Included?	Terminal Software Included?	Warranty	Price
Westridge 64-20	Anchor Automation, Inc.	Commodore 64, VIC-20	no	Bell 103	direct-connect	300	full/half	yes	yes	no	light	host computer	yes	yes	2 years	$99
1650 Automodem	Commodore Business Machines	Commodore 64	no	Bell 103	direct-connect	0-300	full/half	yes	yes	no	LED	host computer	plugs into computer	no	90 days	$79
VICmodem	Commodore Business Machines	VIC-20 and Commodore 64	no	Bell 103	direct-connect	0-300	full	no	no	no	LED	host computer	plugs into computer	yes	90 days	$49
Smartmodem 300	Hayes Microcomputer Products, Inc.	RS-232	yes	Bell 103	direct-connect	0-300	full/half	yes	yes	yes	LED	AC	yes	no	2 years	$289
HesModem 1	Human Engineered Software	Commodore 64, VIC-20	no	Bell 103	direct-connect	0-300	full/half	no	no	no	light	host computer	yes	yes	90 days	$74.95
HesModem 2	Human Engineered Software	Commodore 64	no	Bell 103	direct-connect	110-300	full/half	yes	yes	no	on screen	host computer	some	yes	90 days	$109.95
Clear Signal 300-Baud Modem	Inmac	RS-232	yes	Bell 103	direct-connect	300	full	no	no	yes	LED	AC	some	no	1 year	$99
Intec 300	Intec Corporation	RS-232	no	Bell 103	direct-connect	0-300	full/half	yes	yes	no	LED and on screen	AC	yes	yes	1 year	$189
MFJ-1237	MFJ Enterprises, Inc.	VIC-20, Commodore 64	no	Bell 103	direct-connect	300	full	yes	yes	no	LED	host computer	yes	yes (program listing in manual)	1 year	$49.95
MFJ-1233	MFJ Enterprises, Inc.	RS-232	no	Bell 103	acoustic or direct-connect	300	full	no	no	yes	LED	AC	no	no	1 year	$129.95
Microconnection R1A	The Micro-peripheral Corp.	RS-232	no	Bell 103	direct-connect	300	full/half	yes	yes	no	LED	AC	yes	yes	90 days	$199
Microconnection Auto-Print	The Micro-peripheral Corp.	RS-232	no	Bell 103	direct-connect	300	full/half	yes	yes	no	LED	host computer	yes	yes	90 days	$179.95
ATV	The Micro-peripheral Corp.	Commodore 64	no	Bell 103	direct-connect	300	full/half	yes	yes	no	LED	AC	yes	yes	90 days	$179.95
Cat	Novation, Inc.	RS-232	yes	Bell 103	acoustic	0-300	full/half	no	no	yes	LED	AC	yes	no	1 year	$189
D-Cat	Novation, Inc.	RS-232	yes	Bell 103	direct-connect	0-300	full/half	no	no	yes	LED	AC	yes	no	1 year	$199
J-Cat	Novation, Inc.	RS-232	yes	Bell 103	direct-connect	0-300	full	yes	yes	yes	LED	AC	yes	no	1 year	$149
103 Smart-Cat	Novation, Inc.	RS-232	yes	Bell 103	direct-connect	0-300 & 110	full	yes	yes	yes	LED	AC	yes	no	1 year	$249
Operator 103	TNW Corporation	RS-232	yes	Bell 103	direct-connect	0-300	full/half	yes	yes	yes	beep	AC	some	no	2 years	$169
UDS-103JLP	Universal Data Systems	RS-232	yes	Bell 103	direct-connect	0-300	full	yes	no	no	light	telephone line	some	no	1 year	$165
UDS-103O/ALP	Universal Data Systems	RS-232	yes	Bell 103	direct-connect	0-300	full	no	no	no	light	telephone line	yes	no	1 year	$125
Mitey Mo	USI Inc.	RS-232	no	Bell 103	direct-connect	300	full/half	yes	yes	yes	on screen	host computer	yes	yes	3 years	$99.95

IT'S HERE

COI

INTRODUCING OKIMATE 10... THE FIRST

The printer in a class by itself.

It's here! The new OKIMATE 10 Personal Color Printer. The first color printer that lets you show off and tell all. The printer that lets you print all the information you can create with your Atari® or Commodore® computer. But with the remarkable ability to create original drawings and graphics as well, in over 26 beautiful colors.

A class act! The OKIMATE 10 gives you crisp, clean term papers, school reports and homework. Word processing capability means everything you do can be printed letter quality in minutes, instead of typed in hours. OKIMATE 10 color gives you the opportunity to print graphs, charts and pictures from popular graphics and drawing programs. OKIMATE 10's brilliant color means you'll shine, every time.

OKIMATE 10 feels right at home. Anywhere.

A special PLUG 'N PRINT™ package lets you plug your new OKIMATE 10 into your Atari or Commodore computer. And print. It's that easy. In minutes you'll be printing everything from soufflé recipes to needlepoint patterns. Party invitations to kitchen inventory. Love letters to gardening directions. At 240 remarkable words per minute. And not just in black and white, but in over 26 brilliant colors!

Financial statements will keep you tickled pink for very little green.

If you use your personal computer to keep track of mortgage payments, tuition payments, balance your checkbook or jump ahead of the Dow Jones', there's good news for you. You'll find that the new OKIMATE 10 gets down to business quickly. And easily.

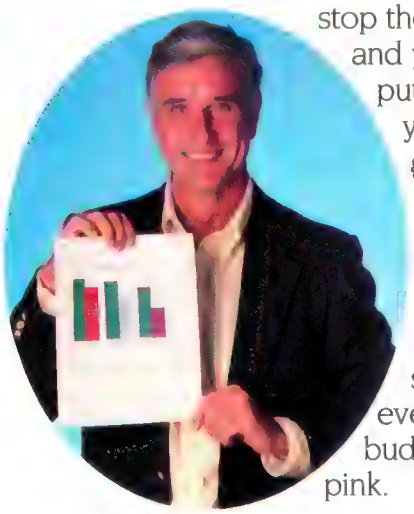
A "Learn-to-Print" diskette and tape shows you how to set up your new personal color printer and start printing. A complete OKIMATE 10 Handbook will show you how you can take your imagination to places it's never been before.

*Atari is a registered trademark of Atari Inc. *Commodore is a registered trademark of Commodore Business Machines, Inc.

OR

PERSONAL COLOR PRINTER UNDER $250.

And while your imagination is soaring, you'll be glad to know that your new printer can keep right up with it! The new OKIMATE 10 is built with the same tradition of quality and manufacturing excellence that has made Okidata the most respected name in computer printers. Okidata craftsmen specially designed and engineered the new OKIMATE 10 to be incredibly small and lightweight. And they made it quiet as a whisper. But their imagination didn't stop there. To help you and your personal computer keep within your personal budget, they made the OKIMATE 10 available at retailers everywhere for less than $250. Something that should make every personal budget tickled pink.



Color your world.

If you've been playing games on your personal computer, now you can get serious and still have fun. The new OKIMATE 10 is completely compatible with a variety of software packages that will run on your Atari and Commodore with a simple disk drive. Just load and you're off and running. Plotting charts. Designing special graphs. Creating original illustrations and pictures. Drawing special graphics. And printing them all beautifully for everyone. On most kinds of paper. In over 26 beautiful colors!

QUESTIONS & ANSWERS

Q: Why do I need a printer?

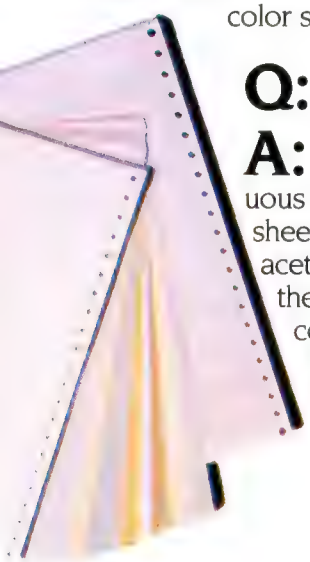
A: You might as well ask, "Why do I need crayons?" When it comes to communicating, "putting it on paper" is still the best way to get your message across. You can have lots of computer equipment, but without the OKIMATE 10, it doesn't mean very much. Unless you get your letter, report, term paper or party invitation off the screen and down on paper, nobody's going to see it.

Q: What makes the OKIMATE 10 better than any other printer?

A: Because the OKIMATE 10 is unlike any other printer. First, it prints in COLOR. Up to 26 beautiful colors. Second, it prints up to 240 words a minute, so quietly you can talk in a whisper right next to it and still hear every word! And third, it prints letter quality, every time.

Q: What about graphics and pictures?

A: The OKIMATE 10 does it all. Graphs, charts, symbols, pictures, illustrations, and special drawings! With a compatible drawing package, anything you create on your screen can be printed in full color; a disk drive is required for color screen printing.



Q: What kind of paper can I use?

A: Just about any kind of smooth paper you want. From continuous feed computer paper to single sheets. From mailing labels to plastic acetate for overhead transparencies, the OKIMATE 10 prints crisp, clean, colorful images you'll be proud to send to friends, teachers, business associates, or frame and hang right in your own living room!

Q: Is the OKIMATE 10 easy to use?

A: As easy as "PLUG 'N PRINT!" No other printer is easier to use than the OKIMATE 10. Connecting the printer to your Commodore or Atari computer is, literally, a snap. The exclusive PLUG 'N PRINT package snaps into the printer. One cable connects it directly to your computer or disk/tape drive. Turn it on and you're in business. Once your OKIMATE 10 is up and running, the "Learn-to-Print" software program (included) teaches you printer basics—the "Color Screen Print" disk (also included) automatically prints everything on the screen in a single stroke. As a matter of fact, most of your printing can be done with just one command.

Q: What's the printer like in operation?

A: In one word: easy! Incredibly easy! The ribbon comes in a "Clean Hands" cartridge. So it's as easy to change as the tape in your audio cassette player.

Q: What about reliability?

A: Okidata has built the reputation of its complete line of printers on quality, dependability and rugged construction. The OKIMATE 10 is no exception. Don't let its light weight and compact size fool you. This printer is not a toy. It's a workhorse.

OKIDATA
an OKI AMERICA company

Available at retailers everywhere.

Modem Manufacturers And Distributors

Listed below are the manufacturers and distributors of the modems included in this buyer's guide.

Anchor Automation, Inc.
6913 Valjean Avenue
Van Nuys, CA 91406

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380

Hayes Microcomputer Products, Inc.
5923 Peachtree Industrial Boulevard
Norcross, GA 30092

Human Engineered Software
150 N. Hill Drive
Brisbane, CA 94005

Inmac
2465 Augustine Drive
Santa Clara, CA 95051

Intec Corporation
P.O. Box 5164
West Bloomfield, MI 48033

MFJ Enterprises, Inc.
921 Louisville Road
Starkville, MS 39759

The Microperipheral Corporation
2565 152nd Avenue N.E.
Redmond, WA 98052

Novation, Inc.
20409 Prairie Street
Chatsworth, CA 91311

TNW Corporation
3444 Hancock Street
San Diego, CA 92110

Universal Data Systems
5000 Bradford Drive
Huntsville, AL 35805

USI
71 Park Lane
Brisbane, CA 94005

Any modem you buy will be capable of full, half, or both types of *duplexing*. With a half duplex modem, only one computer can "talk" at a time, while full duplexing allows both the sender and receiver to transmit at the same time, much like a normal conversation. Full duplexing is pretty standard on most bulletin boards; when you type something, it goes over the phone lines and the receiving computer echoes it back to your TV screen or monitor.

When you access a bulletin board system, it will usually tell you what type of duplexing is needed, as well as the *baud rate*, or speed at which you can transmit information.

Most of the modems in this buyer's guide have baud rates from 0–300, which roughly translates to 0–30 characters per second. Some of the more expensive models have a baud rate of 1200 or more.

The *communication standard* of your modem also tells you the baud rate. Those listed as Bell 103 allow information to be sent at 300 baud; some can go as fast as 600 baud. Bell 202 and 212A standards allow for faster transmission rates.

Extras to consider for your modem are whether you want one that can automatically dial and answer the telephone, and whether the modem is capable of a *self-test* to make sure everything is hooked up and working properly.

One essential item, as we noted, is *terminal software*. Some modems come with their own software; if yours doesn't, you'll have to purchase a terminal program, or type one in from a manual or magazine. (For a Commodore-specific terminal program, see "C/G Term" elsewhere in this issue.)

The accompanying chart gives specifications for many brands of modems for the 64 and VIC, each priced under $300.

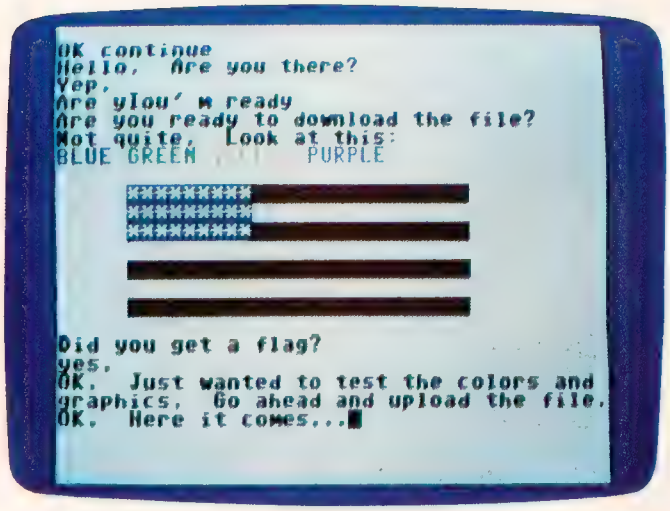
GAZETTE Telecommunications Software

Part 1: C/G Term

Robert Sims

The first in a series of integrated telecommunications software, "C/G Term" (Color/Graphics Terminal program), is tailor-made for VIC (with 16K expansion) and 64 users. It's easy to use and includes a number of transparent features which take care of the time-consuming and tedious chores normally involved in telecommunicating. Written entirely in machine language for speed and efficiency, no knowledge of ML is required for its use.

C/G Term offers upload and download capabilities and makes full use of Commodore's color and keyboard graphics. Next month, we'll continue with the C/G Bulletin Board System. Although C/G Term is designed for use with the bulletin board, it can be used as a stand-alone terminal program for instant two-way telecommunication. A disk drive and modem are required.



Telecommunicating in color with C/G Term.

"C/G Term" is a lot like having a two-way typewriter and a chalkboard plugged into your telephone.

This terminal program makes your computer work in much the same way as when you are typing in a BASIC program or using a word processor: Whatever you type on the keyboard is displayed on the screen. But C/G Term also transmits your words and graphics characters, in color, over the phone line, and displays incoming characters as well.

Two people with telephones, modems, and copies of C/G Term can communicate in several

LAST NIGHT WE EXCHANGED LETTERS WITH MOM, THEN HAD A PARTY FOR ELEVEN PEOPLE IN NINE DIFFERENT STATES AND ONLY HAD TO WASH ONE GLASS...

That's CompuServe, The Personal Communications Network For Every Computer Owner

And it doesn't matter what kind of computer you own. You'll use CompuServe's Electronic Mail system (we call it Email™) to compose, edit and send letters to friends or business associates. The system delivers any number of messages to other users anywhere in North America.

CompuServe's multi-channel CB simulator brings distant friends together and gets new friendships started. You can even use a scrambler if you have a secret you don't want to share. Special interest groups meet regularly to trade information on hardware, software and hobbies from photography to cooking and you can sell, swap and post personal notices on the bulletin board.

There's all this and much more on the CompuServe Information Service. All you need is a computer, a modem, and CompuServe. CompuServe connects with almost any type or brand of personal computer or terminal and many communicating word processors. To buy a Starter Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

CompuServe

Consumer Information Service
5000 Arlington Centre Blvd., Columbus, OH 43220
800-848-8199
In Ohio call 614-457-0802.

An H&R Block Company

ways. They can talk, type messages back and forth, or swap programs and text files automatically, with only a few keystrokes.

C/G Term can also be used off-line, to create graphics screens and messages for later use. And it's designed to communicate with the Color/Graphics Bulletin Board System, to be published next month.

For Commodore Only

Most bulletin board systems (BBSs) and information utilities (like CompuServe or Delphi) are designed to work with a wide variety of computers and modems. For this reason, most use standard seven-bit ASCII. Terminal programs generally do not allow you to send Commodore graphics characters, which do not have a standard ASCII equivalent.

To send graphics and color requires a new Commodore-specific protocol. For this reason, you cannot use this terminal program to call CompuServe or most bulletin boards. The computer you call must be running C/G Term or next month's Color/Graphics Bulletin Board.

The incompatibility with CompuServe is offset by C/G Term's color and graphics capabilities, as well as the reliable and easy-to-use upload/download features which allow you to trade files with friends.

Typing Over The Phone

The program automatically handles most of the technical aspects of personal telecommunications, allowing you to concentrate on your message, rather than on the transmission medium.

To use the program for two-way communication, connect your modem to the computer's user port *while the power is off.*

One party must set the O/A switch on the modem to O (originate) while the other party must use A (answer). If you're using the Commodore Automodem, set the H/F switch to F (full duplex), and set the D/T switch to T (telephone).

Load C/G Term and run it. An initialization prompt will appear on the screen:

Press any key
to start, or
CTRL-C to
bypass handshake

This means the computer is on hold. If you're calling a friend, you can go ahead and press CTRL-C to bypass the handshaking routine (which is more important for the C/G Bulletin Board). When the other party answers, unplug the cord from the telephone handset and plug it into the VICmodem (or move the Automodem D/T switch to D for data). The two programs will then complete the connection, and you'll see the "OK continue" prompt.

Function Key Assignments

Key	Terminal Mode	Message Mode
f1		load a message file
f2		send message to bulletin board
f3	change border color	change border color
f4	change background color	change background color
f5		save screen into a message file
f6	clear the screen	clear the screen
f7	not used	
f8	go to message mode	go to terminal mode

The program starts in *terminal mode,* which simply means the computer is ready to communicate with another VIC or 64. Once the connection is made, you can switch back and forth from modem to voice communication without disturbing the program. To talk, unplug the cord from the VICmodem and plug it into the handset (or move the Automodem D/T switch from D to T). When you're through talking, just move the Automodem switch back to D (on the VICmodem, plug the handset cord back into the modem), and resume typing.

The program makes use of the standard keyboard, with a few exceptions. The CLR key is disabled, the function keys (f1–f8) perform specific tasks, and the CTRL key has a special significance. Also, as you type in responses to prompts, you may notice that some keys don't seem to work. For example, if you are asked for a filename, the program will only accept letters, numerals, and the period. All other characters are ignored. Or, if the program asks for a number, alphabetical characters are ignored.

As a general rule, if you press a key and nothing appears on the screen, the key has been ignored.

Color And Graphics Keys

In terminal mode, you have full control over screen and character colors, and the full set of keyboard graphics characters is available.

Border and background colors are usually changed with POKEs. But C/G Term lets you change the border color by pressing the f3 function key; to change the background color, use f4. The f3 and f4 keys change only *your* screen's colors; they are not transmitted over the phone line to the other party.

However, character color *is* transmitted, so be careful not to change your character color to the same color as the other party's background and cause your message to be invisible.

As you might expect, character color is

You bought a computer to cultivate your kids' minds. Make sure it's bearing fruit, not growing vegetables.

Introducing a whole crop of Learning Adventure games from Spinnaker.

When it comes to cultivating adventurous young minds, the computer's potential is endless.

Unfortunately, the search for software that makes the most of that potential has been endless, too.

That is, until Spinnaker created the Learning Adventure Series. A unique collection of games that reward curiosity with hours of adventure and learning. So the time kids spend with our games will help them develop valuable skills. Instead of just tired thumbs.

But what really makes our Learning Adventure games unique—educational value aside—is how much fun they are. Which isn't too surprising when you consider you can do things like bargain with aliens, search a haunted house, or build your own railroad empire.

In fact, our games are so much fun, kids will really enjoy developing some very important skills. Deductive reasoning, note taking, and problem solving, for instance.

So, if you're in the market for software that will truly cultivate young minds, pick the Spinnaker Learning Adventure Series.

It's the best way to be sure your search will be fruitful.

Spinnaker Learning Adventure games are available for Apple,® Atari,® IBM® and Commodore 64™ home computers.

It's New! TRAINS.™
You're in charge of an old-time railroad—and whether it turns into a bonanza or a bust depends on how well you run it. But either way you'll find that working on this railroad is a challenge—and a lot of fun! **Ages 10-Adult.**

It's New! ADVENTURE CREATOR.™
Design a challenging adventure game that you or a friend can tackle—or let the computer design one for you. It's complex, exciting—utterly addictive! **Ages 12-Adult.**

IN SEARCH OF THE MOST AMAZING THING.™
It isn't easy to find—even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing. **Ages 10-Adult.**

SPINNAKER™
We make learning fun.

Disks for: Apple, Atari, IBM, and Commodore 64.
Cartridges for: Atari and Commodore 64—(ADVENTURE CREATOR only).

Apple, Atari and IBM are registered trademarks of Apple Computer, Inc., Atari, Inc. and International Business Machine Corp. Commodore 64 is a trademark of Commodore Electronics Ltd. ©1984, Spinnaker Software Corp. All rights reserved.

IT'S YOUR TIME AND BOTTOM LINE!

COMMODORE OWNERS now have an alternative to the frustrating LOAD ... wait ... UNLOAD ... wait ... RELOAD ... wait procedure. The NEW MSD DUAL DISK DRIVE ... SUPER DISK II will eliminate those hours wasted during task performance and time lags that inflate expensive labor costs and deflate your bottom line.

One SUPER DISK II will copy, format, and verify in less than two minutes ... a procedure that normally takes 30 to 40 minutes using 2 single drives. Yes, SUPER DISK II is TWENTY TIMES FASTER!

MSD provides quality craftsmanship that is backed by an exceptional six month warranty. The SUPER DISK II workhorse drive never overheats, so why be aggravated by the loss of time and money?

Invest today in SUPER DISK II, the SMART disk drive which contains its own microprocessor and memory enabling the computer to command the drive and then continue. SUPER DISK II does the work quickly so that you can get on with your program.

As for the money you will save in unproductive labor costs ... perhaps you will invest it in a daisychain of SUPER DISKS. These workhorse drives will allow you to connect up to four drives for maximum speed and reliable, continued performance.

SUPER DISK II DESIGN ASSETS

- Sturdy sheet metal casing and heat sink
- Vertical load for ergonomic space efficiency
- Key latch secures disk position
- Smart disk contains microprocessor and memory in each drive
- Status lights to display which drive is in use
- Three steel bands for repeated accuracy of alignment
- Flexible use of serial or parallel communication
- Access flexibility configured as drive 0 or drive 1

MSD SYSTEMS, INC.

Dealer and distributor inquiries invited.

SUPER DISK II Features and Specifications

COMPATIBILITY	Commodore 64,™ VIC-20,™ PET™ CBM
BUFFER MEMORY CAPACITY	6K
COMPLETE DUPLICATION TIME: Format, Copy & Verify a Full Disk.	Less than 2 minutes. (Compare to 30-40 minutes with two 1541s).
TIME TO FORMAT	17 seconds. (Compare to 1 min/20 sec. with 1541).
SERIAL BUS	YES, 2 connectors.
PARALLEL BUS	YES, for enhanced speed, IEEE for Commodore compatibility.
DAISYCHAIN	Up to 4 drives
OPERATIONAL SUPPORT	• Power-on diagnostics to ensure proper disk drive operation. • LED status lights display where error is occurring. • Easy to understand instruction manual.
OVERHEAT TIME	NONE. Tested for weeks of continual operation.
WARRANTY	• 6 MONTHS. (Compare to 3 months for 1541). • 48 hour factory repair service. • Local service centers.

WHEN YOU ARE READY TO GET DOWN TO SERIOUS COMPUTING

RELIABLE SINGLE DRIVE READILY AVAILABLE

MSD Systems also offers COMMODORE OWNERS the reliable and efficient SUPER DISK I, a single disk drive which is compatible with the COMMODORE 64, VIC-20, and PET computers. Like the dual drive, MSD's SUPER DISK I never overheats ... its internal state-of-the-art design provides exceptional durability and longer life even in continuous run cycles, with more speed and power for internal operations.

A greater 4K double capacity buffer memory allows users to open more files at any one time. The drive accomplishes many internal operations in less time than other single disk drives require. The SUPER DISK I can format disks in 17 seconds, and execute utility commands in a minimum amount of time.

The SUPER DISK I has both serial and parallel buses. Up to three times the serial communication's speed can be achieved by adding the MSD IEEE 488 interface (CIE) and IEEE/PET cable.

The unique vertical load architecture of MSD's SUPER DISKS reduces desktop space normally required. The durable sheet metal casing minimizes heat retention and contributes to the reliability and long life of the SUPER DISKS. MSD confidently offers an exceptional 6 month warranty to support SUPER DISK users.

MSD SUPER DISK DRIVE TECHNICAL SPECIFICATIONS

STORAGE*

Total Capacity	174848 bytes per diskette
Sequential	168656 bytes per diskette
Relative	167132 bytes per diskette 65535 records per file
Directory Entries	144 per diskette
Blocks	683 total per diskette 664 available per diskette
Tracks	35 per diskette
Sectors	17 to 21 per track
Bytes	256 per sector
Diskettes	Standard 5¼", single sided single density

*NOTE: The SD-2 contains two disk drive mechanisms and can therefore handle two times the above capacities (one for each diskette).

SOFTWARE

16K Bytes Operating System
4K RAM buffer area (6K for the SD-2)
Microprocessor based disk controller (6511Q)
Commodore Compatible Serial Bus Interface
Commodore Compatible IEEE Parallel Bus Interface

PHYSICAL DIMENSIONS

	SD-1	SD-2
Height	6.2" (157 mm)	6.2" (157 mm)
Width	4.2" (107 mm)	5.9" (150 mm)
Depth	13.3" (338 mm)	13.3" (338 mm)

INTERFACE

Dual Commodore compatible Serial Bus
Commodore compatible IEEE Parallel Bus
Jumpers for selecting device number 8, 9, 10 or 11.

ELECTRICAL REQUIREMENTS

Voltage	110 or optiona 220 VAC
Frequency	50 or 60 Hertz
Power	50 Watts

10031 Monroe Drive, Suite 206 • Dallas, Texas 75229 • 214-357-4434 • Outside Texas 800-527-5285

changed by pressing the CTRL key in combination with the number keys. If you have a 64, you can also hold down the Commodore key and press one of the number keys. (For a discussion of changing character color, see the User's Guide that came with your computer.) Character color may cause problems for a VIC owner communicating with a 64. The VIC will not properly receive the eight extra colors generated by the 64's Commodore key. So, if you have a 64 and are talking to a VIC, use only the CTRL key to change your character color.

To clear the screen, press f6 (SHIFT-f5).

The graphics characters on the front of the keys are generated by pressing the appropriate key while holding down the Commodore key (for the character on the left of the key) or the SHIFT key (for the character on the right).

When the program starts, the keyboard is in lowercase mode. This means that when you press SHIFT, you get uppercase letters instead of graphics characters. But the graphics characters associated with the Commodore key will work in lowercase mode.

You can toggle between lowercase and uppercase/graphics modes by pressing the SHIFT and Commodore keys at the same time, just as in normal operation. In the uppercase mode, you get uppercase letters, the graphics associated with the Commodore key, and the SHIFTed graphics as well.

File Transfers

C/G Term provides for automatic disk-to-disk transfer of either sequential files or program files. The files may contain any type of data, whether a BASIC or machine language program, graphics characters, a *SpeedScript* document, or data created by some other word processor.

You can use C/G Term as your own private electronic mail carrier. For example, you can write a letter with *SpeedScript* and save it to disk. Then you can call a friend, connect your computers using C/G Term, and upload the letter. Later, your friend can use his or her copy of *SpeedScript* to read the letter. The long-distance charge may be more than a 20-cent stamp, but your letter arrives immediately.

If you want to send a file to the other party, then you are the *uploader* and the other party is the *downloader*. The uploader sends an existing file to the downloader's disk drive, where it is stored as a new file.

Easy Uploading

To transmit a file, the uploader types CTRL-U (press U while holding down the CTRL key). C/G Term then takes over. Each party will see the messages searching for the filename and loading. The downloader's filename will appear as $0:@!%!, which is a dummy filename for reading a directory off the disk. This can be ignored, as the program handles the exchange automatically. The uploader is prompted for the name of the existing file to be transmitted, while the downloader is prompted for a new filename so the incoming file can be stored onto disk.

Once the respective filenames have been typed in, the two programs perform several *handshakes* (communications exchanges) in which information is exchanged on whether there is room on the receiving disk for the incoming file, whether the file type is sequential or a program, and when to start transmitting. All of this is performed automatically by the program.

The file is then taken from the disk of the sending computer, transmitted, and stored on the disk of the receiving computer.

An *image* of this process is displayed on the screen. You'll see a series of lines consisting of a colon followed by 76 numbers or letters, comprising a hexadecimal image of the file's contents.

Uploading becomes a simple process. The uploader presses CTRL-U and the name of the program. The downloader just invents a filename. C/G Term does the rest (of course, your disk drive has to be on, with a disk inserted).

Checking For Accuracy

There will be a brief pause after each line is sent, while the receiving computer calculates a *checksum* to insure that the line was transmitted correctly. If not, the line is sent again. When the transfer is complete, the message "OK continue" is displayed, and the program returns to terminal mode.

Even though file transfer is automatic, it is not failsafe. For example, if the uploader fails to type in the filename exactly as it appears in the disk directory, an error message is printed and the operation is cancelled. An error message and cancellation also occur if the downloader types in the name of an existing file.

To avoid these errors, it's good practice to make a copy of the disk directory before you go on-line, so you'll know exactly what's on the disk. Or, make up a name you know is not on the disk (like QWERTY).

If a mistake is made, though, no harm is done. The program returns to terminal mode, and you can try again.

Other problems are not so simply solved. No error-trapping routine can overcome noisy phone lines or hardware failures. Even though such

"Now Your Commodore 64™ Can Print Like a Pro!"

Grappler™ CD
Printer Interface

The Revolutionary Printer Interface for the Commodore 64™

A New Era in Commodore Printing Power.

Grappler CD offers the first complete answer to your printer interfacing requirements, with many powerful capabilities unique in the Commodore marketplace. Complete signal translation allows many popular name brand printers to operate perfectly with the Commodore 64, or to imitate Commodore's own printer. Even Commodore's graphic character set can be reproduced on Epson, Okidata, Star, ProWriter and other popular printers.

Exclusive Grappler CD features provide a variety of graphic screen dumps, text screen dumps and formatting. No other Commodore interface can offer this.

If you own a Commodore 64...

If you're serious about quality, trouble free printing... You need the Grappler CD.

Contact your nearest Commodore dealer or call Orange Micro for a dealer near you.

Commodore 64 and Commodore 1525 are trademarks of Commodore Electronics Limited
Epson is a registered trademark of Epson America, Inc

A Uniquely Intelligent Interface:

- Prints Screen Graphics Without Software
- Graphics Screen Dump Routines Include Rotated, Inversed, Enhanced and Double Sized Graphics.
- Full Code Translation From Commodore's PET ASCII to Standard ASCII, the Language of Most Printers.
- Complete Emulation of the Commodore 1525 Printer for printing of Commodore's Special Characters.
- Dip Switch Printer Selection for Epson, Star, Okidata, ProWriter and other popular printers.
- Conversion Mode for Easy Reading of Special Commodore Codes.
- Text Screen Dump and Formatting Commands
- 22 Unique Text and Graphics Commands

Orange Micro inc.

1400 N. LAKEVIEW AVE., ANAHEIM, CA 92807 U.S.A.
(714) 779-2772 TELEX: 183511CSMA

© Orange Micro, Inc., 1983

problems are rare, you can make the best of a bad situation if you know what to expect.

Garbage On The Line

Sometimes you'll get strange characters on your screen (garbage) even when you are typing carefully. These garbage characters usually occur for one of two reasons: Either there is some disturbance in the phone signal, or one of the modems is malfunctioning.

If the transmission is normally correct, but an occasional garbage character comes in, the phone line probably is the culprit. If a transmission suddenly turns to total garbage for both parties, you can probably blame the phone connection again.

But if you experience such problems constantly, or if you're getting garbage while the other party is receiving without difficulty, take your modem back to the dealer or service center and have it checked.

If garbage is mixed into an image line during a file transfer, the line will be retransmitted up to five times before the program aborts the transfer, closes the disk files, and returns to terminal mode. The first two characters will be an up arrow followed by a capital R when a section is being retransmitted.

Crash Insurance

If garbage interferes with a handshake, the two programs may go into an infinite loop, waiting for a signal that's never coming. This is highly unlikely, but if it happens you'll notice that the image display has stopped, without an error message.

Also, the red light on the drive will remain on, indicating that a disk file is still open.

The solution is for both parties to go offline by holding down RUN/STOP and pressing RESTORE. Then type:

```
CLOSE 15:OPEN 15,8,15:CLOSE 15
```

to close the file. Next, initialize the disk:

```
OPEN 15,8,15,"I0":CLOSE 15
```

Then run C/G Term again (the 64 version requires a SYS), press RETURN, enter a CTRL-C, and your connection should be restored. If it isn't, then both parties must reload their programs and run them again to restart the handshaking.

Disk Problems

Another potential problem (though very rare) involves the disk drive and disk. C/G Term cannot evaluate the data; the program takes whatever data the drive sends. If the drive is out of alignment, if the read/write head is dirty, or if the disk surface is worn or damaged, then it's possible that bad data can be transferred.

If you find garbage in a transferred file, check the original file. If the original was clean, chances are good there's been a drive malfunction, or you have a defective disk. If you get a garbled file, try another disk.

The life of a disk is difficult to estimate, since it depends on how often the disk is used. Also, it's hard to see signs of wear on the surface, and most disks are so reliable as to give the impression that they last forever. But disks do wear out, and even a tiny flaw can render a disk useless. To be safe, if the disk surface looks worn, replace it. If you can't remember how long ago you started using the disk, replace it.

Avoid using a disk that's full, or nearly full (less than 100 blocks free). When you begin an on-line session, you can't be sure how many files you may download or how long they may be. If there's plenty of room on the disk, you won't need to worry about having a transfer canceled with a "FILE WON'T FIT" message.

Creating Graphics Files

Besides transmitting programs and text files, C/G Term has a message mode that lets you create graphics screens or brief messages, and save them to disk for uploading later.

You can enter the message mode in two ways. First, you can load and run the program without hooking up your modem. When the initialization message is displayed, press CTRL-C, which puts you into terminal mode without going through the on-line handshaking sequence. To get to message mode from here, press f8. The screen will clear and "message mode" will be displayed.

You can also get to message mode while on-line by pressing f8. Keep in mind, though, that the other party will be ignored while you're in message mode.

To create a screen, simply type in the graphics or message contents. You can move freely around the screen, but are not allowed to type anything on the last screen line. There are two reasons for this limitation: First, it prevents your message from scrolling up the screen. And the bottom screen line is used to display prompts and error messages which otherwise would destroy your design.

When you're satisfied with your screen, press f5. You'll be prompted for a filename. If you have a VIC, this filename must contain fewer than 10 characters, since the screen will scroll and destroy your design if you type beyond the end of the line. Enter the filename, press RETURN, and your graphics screen will be

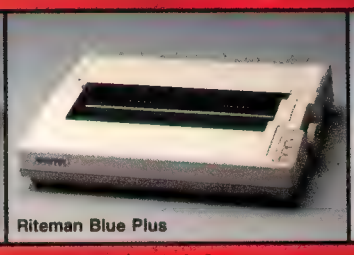
RITEMAN.

IT MAKES THE RIGHT IMPRESSION.

Riteman announces LQ—the letter-quality printer that's small enough to hold in one hand. Tiny, super-portable and efficient, LQ weighs less than 7 pounds and costs under $300. The Riteman LQ. It's the right choice.

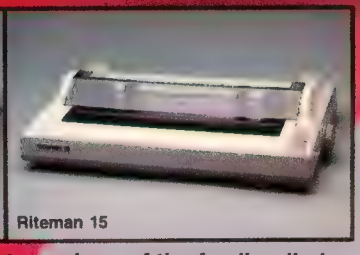
Riteman LQ

Riteman Plus



Riteman Blue Plus

Riteman II



Riteman 15

RITEMAN

INFORUNNER CORPORATION Airport Business Center
431 N. Oak St. Inglewood, CA 90302
[illegible] (outside Calif.), (800) 421-2551 (In Calif.)

Inforunner proudly announces the three newest members of the family, all plug-compatible with the following computers:
RITEMAN BLUE MAC WITH APPLE MACINTOSH AND II C.
*RITEMAN R64 WITH COMMODORE.***
*RITEMAN R800 WITH ATARI.****

*Apple, Macintosh and IIC are registered trademarks of Apple Computer Inc.
**Commodore is a registered trademark of Commodore Business Machine, Inc
***Atari is a registered trademark of Atari, Inc

saved to disk.

As with downloading, you must not use the name of an existing file.

In message mode, you also can load a screen file, edit it, and save it back to disk. But again, be sure to save it under a new filename to avoid an error message.

To erase a screen and start over, press f6. To return to terminal mode from message mode, press f8.

Another use for CTRL-C at the initialization prompt is to help you learn to use C/G Term without going on-line.

CTRL-C puts you in terminal mode even though your modem is not connected. You can learn to change colors, type graphics characters, and experiment freely with cursor movement. If you first try out C/G Term on your own, you will avoid delays and errors when you do go on-line with another person.

You can practice with any feature except uploading. If you press CTRL-U without being connected to another computer, the program will lock up because it's trying to shake hands and nobody's shaking back. If this happens, hold down RUN/STOP and press RESTORE. Then load the program and run it again.

The Bulletin Board

Message mode does double duty in C/G Term. It allows you to create and save screens, and it's the routine you'll use to send messages to the bulletin board system to be published next month.

In that issue, we'll go into the details of how C/G Term and the bulletin board interact. For now, you should know that all the color and graphics features discussed here also will work with the bulletin board. Together, the programs allow you to read public messages, leave messages for others, to send and receive private electronic mail, and to upload or download files.

Typing In With MLX

To type in C/G Term for either the VIC (16K expansion required) or 64, first type in MLX, elsewhere in this issue, and save it to disk. Before beginning, read the instructions for using MLX.

Next, turn your computer off and then on and enter this line:

POKE 642,45: SYS 58260 (Commodore 64)
POKE 642,45: SYS 58232 (VIC-20 with at least 16K expansion)

This POKE and SYS relocate the beginning of BASIC so MLX will run above the section of memory used by C/G Term. Now you can load MLX back into your VIC or 64.

Enter RUN and you'll be prompted for a starting and ending address. The starting address is 4609, the ending address is 11262. Commodore 64 users should type in the listing exactly as shown in the back of the magazine. VIC users should also type in the same listing, but replace the last three lines of the program with these:

```
11245 :234,234,022,132,015,017,123
11251 :227,016,021,022,023,020,060
11257 :022,021,234,234,234,234,204
```

After the program is saved to disk, VIC users can load the program by typing LOAD"CGTERM",8. Then simply type RUN as you would for a BASIC program. (Of course, this assumes that you used the filename CGTERM when you saved the machine language you typed in using MLX.) Load the 64 version by typing "CGTERM",8,1. To run, type SYS 4621. Alternatively, 64 owners who don't want to have to remember the SYS address can use the following short boot program. When run, this program will load in and start the machine language:

```
10 IF A=0 THEN A=1:LOAD "CGTERM",8,1
20 SYS 4621
```

Modifying C/G Term

C/G Term uses about 8K of memory, including the object code, variables, and temporary storage areas. Several useful options can be added to the program, including routines to read the disk directory, to save data into a capture buffer, and to dump screens to a printer. There is plenty of room in the 64 or in an expanded VIC for refinements and modifications.

However, because it is written entirely in machine language, changes are difficult to make unless you have the source listing. And the listing is too long to print here. It would take up more space than the MLX listing.

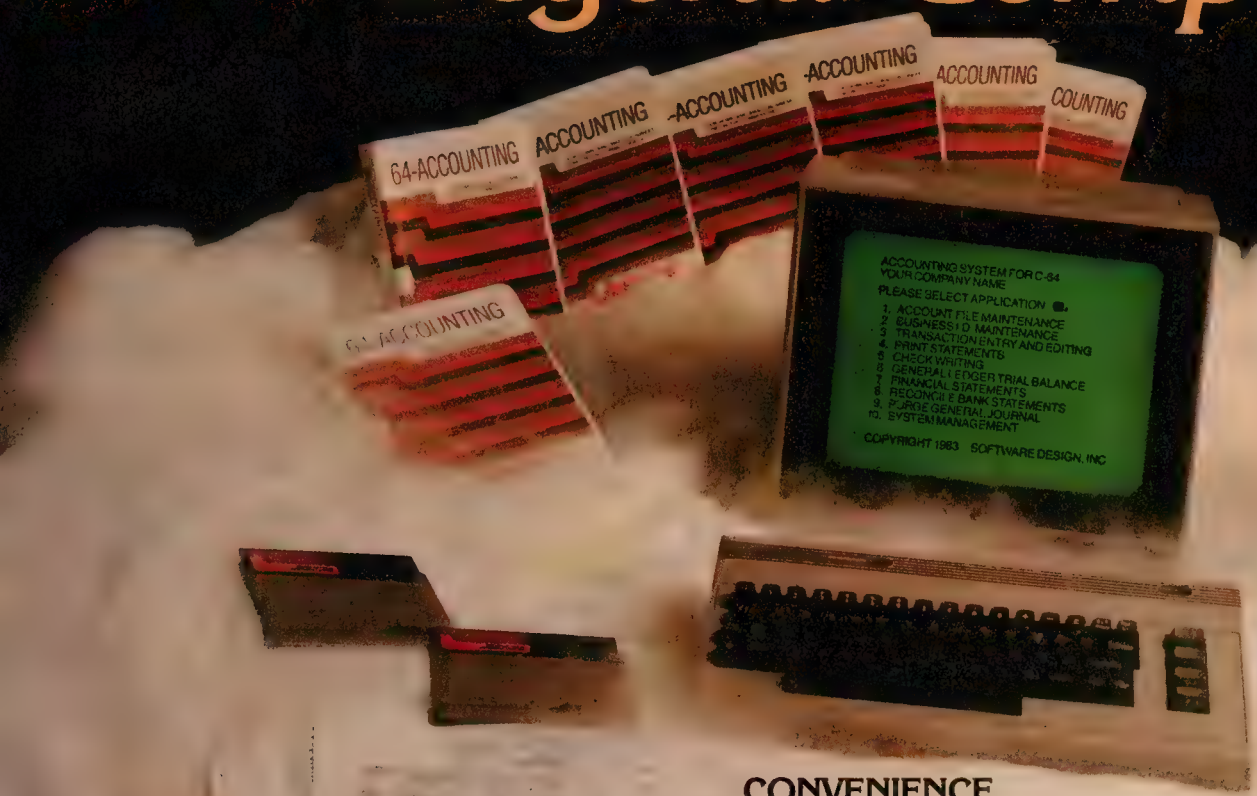
If you wish to modify the program or study any of the routines, or you'd just rather not type it in, you can get a copy of the source listing in PAL/LADS format (and the machine language program itself—the object code) on disk by sending a SASE (a padded disk mailer is preferable), a blank disk, and $3, to:

Robert Sims
100 Lee Street
Jamestown, NC 27282

My CompuServe ID# is 75005,1553. On Delphi, it's BOZART.

See program listing on page 199.

64 Software Beyond Compare



Introducing The New 64-ACCOUNTING SYSTEM.

If you can't put your finger on your total financial picture, we've got the answer. Software Design, Inc. has a personal software accounting package designed for your Commodore 64®.

Even if you're all thumbs, we offer a support line and an easy-to-follow manual written in plain English. Created for home and small business demands, the 64-ACCOUNTING SYSTEM puts financial management at your fingertips.

FLEXIBILITY

Design your own financial statement with no rigid account number system, and with flexible subtotal possibilities. Take the guesswork out of checkbook balancing. Distribute checks and receipts to 20 separate accounts. Establish monthly, quarterly, or yearly accounting periods. 64-ACCOUNTING expands with your financial management needs.

CONVENIENCE

Organizing your tax return has never been easier. 64-ACCOUNTING offers up to 10 checking ledgers for those special home and business accounts. Teams with your printer to write checks, print statements, profit and loss and trial balance sheets. Even offers mini accounts receivable and accounts payable ledgers.

PRACTICAL BUDGETING

Control your expenses with the 64-ACCOUNTING SYSTEM'S budgeting ledgers. Monitor your past expenses against projected costs. It's so versatile you can select year-to-date totals or any span of months for comparison budgeting.

Plan your financial future around the 64-ACCOUNTING SYSTEM. There may never be a better time than now. **$69.95. To order call 1-800-553-0002. In Iowa call 1-800-772-5771.**

Dealer and distributor inquiries welcome

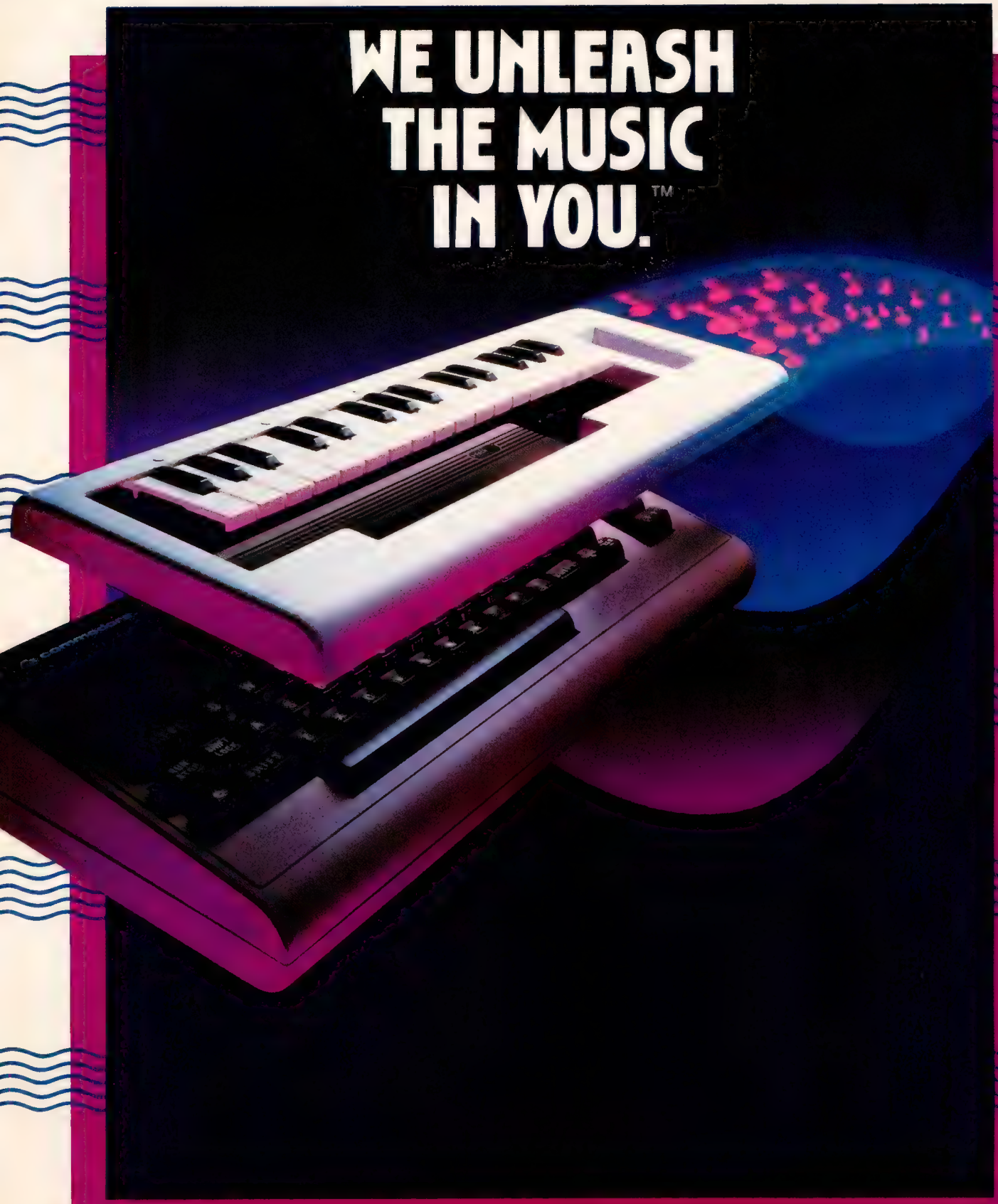
SOFTWARE DESIGN, INC.

P.O. Box 570, Waterloo, Iowa 50704

For use with Commodore 64® and disk drive.

Copyright 1983 — Software Design, Inc.

Commodore 64 is a registered trademark of Commodore Business Machines, Inc.


WE UNLEASH
THE MUSIC
IN YOU.™

The INCREDIBLE MUSICAL KEYBOARD™

transforms your computer into an exciting musical instrument.

The Incredible Musical Keyboard can do more than turn your Commodore into a music synthesizer.

Deep within every Commodore 64 lurks the unexpected. A versatile music synthesizer. A music video machine. A three track recorder. And a way to create music that's so easy you'll be playing songs within minutes.

Just place the Incredible Musical Keyboard over the computer keyboard, load the included music software diskette, and you have all you need to make piano, guitar, synthesizer and electronic sounds.

Everything you need to create music is included . . . whether you're a beginner or an accomplished musician.

If you can press a few keys, you have all the skills it takes to create and play music with the Incredible Musical Keyboard.

Just beginning? Attach the included ABC key stickers to the keys and match the letter in the note with the letter on the key and . . . PRESTO! . . . you're playing music instantly. It's easy. It's fun. It unleashes the music in you . . . even if you don't read music.

You already read music? Great! We've included a Melody Chord Songbook featuring hits from today's top recording artists. Or play songs from your own sheet music.

The Incredible Musical Keyboard works with other exciting Sight & Sound Music Software programs, too!

Get the **KAWASAKI SYNTHESIZER** and transform your Commodore 64 into a sophisticated music synthesizer and sound processor. With one keystroke, you can control waveforms, vibrato, sweep and other special effects. Let your imagination soar with the **KAWASAKI RHYTHM ROCKER** creating and recording your own songs while you control eye-popping color graphics that explode across the screen. Create your own music with the **MUSIC PROCESSOR**, a word processor for music. Then record it, edit it and play it back. Use the 99 preset instrument and special effects sounds for endless new creations. Or travel through a complete tutorial on music synthesis with the newest Sight & Sound music program, **3001 SOUND ODYSSEY**. After you've learned the basics of music synthesis, you can use the complex music synthesizer included in the program to compose your own music, create your own sound effects or simply experiment with the hundreds of pre-programmed sounds.

From the Incredible Musical keyboard to software that plays your favorite hits, we've got them all.

Look for the Incredible Musical Keyboard and the complete line of Sight & Sound music software at your local computer software outlets and music stores. And unleash the music in you.

For more information and a free catalog, phone 1-414-784-5850 or write P.O. Box 27, New Berlin, WI 53151.

SIGHT & SOUND Music Software, Inc.

WE UNLEASH THE MUSIC IN YOU.™

Commodore 64 is a registered trademark of Commodore Business Machines, Inc.

Free Fall Associates: The Designers Behind *Archon* and *Archon II: Adept*

Selby Bateman, Features Editor

Free Fall Associates: Jon Freeman and Anne Westfall.

Emerging from the avalanche of a thousand computer games came *Archon*, 1983's popular and unique mixture of strategy and action, good and evil, light and dark. Now, *Archon's* creators bring you the sequel—and the fight between Order and Chaos is on again.

GAZETTE DISK

☐ One Year Subscription $69.95

☐ Two Year Subscription $129.95

Prices good in US and Canada. Outside the US and Canada please add $36 for each year of subscription.

SUBSCRIBE

Orders must be prepaid:

☐ Payment enclosed

OR CALL TOLL FREE 800-334-0868

Charge ☐ VISA ☐ MasterCard ☐ American Express

Acct. No. _____ Exp. Date ____ / ____

Name _____

Address _____

City _____

State/Zip _____ 34DD01

GAZETTE DISK

☐ One Year Subscription $69.95

☐ Two Year Subscription $129.95

Prices good in US and Canada. Outside the US and Canada please add $36 for each year of subscription

SUBSCRIBE

Orders must be prepaid:

☐ Payment enclosed

OR CALL TOLL FREE 800-334-0868

Charge ☐ VISA ☐ MasterCard ☐ American Express

Acct. No. _____ Exp. Date ____ / ____

Name _____

Address _____

City _____

State/Zip _____ 34DD01

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

GAZETTE DISK
P.O. Box 901
Farmingdale, NY 11737

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD
FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

GAZETTE DISK
P.O. Box 901
Farmingdale, NY 11737

COMPUTE!'s GAZETTE DISK!

Get more out of your Commodore computer.

Start your subscription to *COMPUTE!'s Gazette Disk*. Each month you can receive a fully tested 5¼" floppy disk to run on either your Commodore 64 or VIC-20 personal computer. Each issue of *COMPUTE!'s Gazette Disk* will contain all the programs appearing in the corresponding issue of *COMPUTE!'s Gazette* magazine. So, now you can have all the quality programs found in each month's *COMPUTE!'s Gazette* ready-to-load on a disk. Send in the attached coupon and subscribe today!

Call toll-free **1-800-334-0868**
or send your prepaid coupon to:
COMPUTE!'s Gazette Disk
P.O. Box 5406
Greensboro, NC 27403

Magic is subtle. Magic is sly.

Our ancient and enduring fascination with things magical stems chiefly from that strange interplay between illusion and reality. And at the heart of that fascination is the human imagination.

"We have some pretty wild imaginations," admits Jon Freeman, laughing and smiling at his wife and collaborator, Anne Westfall.

"But in our wildest dreams we did not anticipate a sequel when we created *Archon*. It was just not the kind of game that suggested to us a sequel. We didn't want to just do the same game with a little teeny bit of difference and then resell it."

Freeman and Westfall (hence, Free Fall Associates) and *Archon* co-creator Paul Reiche III faced a dilemma in 1983. The game was so successful that seemingly everyone was asking them for a sequel. And that included Trip Hawkins, a big fan of *Archon* and the president of Electronic Arts, the company that published the game.

Hawkins kept asking them about a follow-up game. And Freeman, Westfall, and Reiche kept saying to themselves, "Sequel? Good grief!"

"First, we had to convince ourselves that it seemed like a reasonable thing to do," says Freeman.

They began to study the components of their own creation, trying to isolate the magical elements that made *Archon* a very different game from any that had appeared before.

The fundamentals were engaging in their own right: A chess-like strategy game which dissolves at times into a fierce arcade-action battlefield. Enough wizards, dragons, goblins, golems, and djinnis to fill a medieval alchemist's nightmare. The struggle to conquer and hold five "power points." And the shifting subtleties of teleporting, summoning "elementals," learning luminosity cycles, and the like.

In fact, to look at the complexity of *Archon* is to realize that the creators of the game are certainly not newcomers to game design or programming.

Paul Reiche III (pronounced RICH-EE), for example, has been involved with the creation of fantasy role-playing games since high school. He worked for TSR, which publishes *Dungeons & Dragons*, following production of his D&D module, *Temple of Poseidon*. Reiche also worked with Freeman on the creation of programs for Automated Simulations (later renamed Epyx), which Freeman cofounded.

Westfall, who took up computer programming at the age of 30, soon found that her talents in that area were considerable. After a couple of years producing complex technical software, she joined Freeman at Automated Simulations and began her efforts in game programs. It was her programming expertise that turned the game designs by Freeman and Reiche for *Archon* and *Adept* into substance.

No name is more associated with excellence in computer game design than that of Jon Freeman. Among the numerous games he developed at Automated Simulations was the award-winning *Temple of Apshai* (for which he designed the Dunjonquest System) and *Star Warrior*. He is also the author of *The PLAYBOY Winner's Guide to Board Games*, *The Complete Book of Wargames*, a variety of stories and articles, and more than a dozen game manuals. With *Adept*, Freeman has now published 17 games.

It was in late 1981 that Freeman and Westfall formed Free Fall Associates, located a couple of miles from the Stanford University campus in Palo Alto, California, and began working with Reiche on what was to become *Archon*. The trio also designed an earlier Electronic Arts release, *Murder on the Zinderneuf*, a murder mystery game which is one of Freeman's personal favorites.

"With *Adept*, what we wanted to do—this is an oversimplification, but—while preserving the mechanics and the general *feel* of *Archon*, mostly the mixture of strategy and tactics, we wanted to do as many things differently as we could," says Freeman. "To do things that we couldn't do in *Archon* for one reason or another. And to put things in that people had suggested."

Why doesn't *Archon* have varying difficulty levels, some players have asked?

Well it does, Freeman replies with a smile, but then admits that the function is subtle and has never been mentioned before. "There's a built-in, self-adjusting difficulty factor in *Archon* so that if the computer keeps beating up on you, it will get easier and easier.

"But most people don't know that because it goes in little tiny increments. By the time it really starts kicking in, players think, 'Oh, I'm just getting better.' Well, they are, partly; but partly it's because the computer is not being as good," he adds, laughing. "But nobody knows that's there. It's not something we advertise, but we were aware of the problem.

"Just like chess: How do two unequal players play chess? Well, not very well. And there's not really a great deal you can do about it. If you start taking pieces away, you change the game so radically that you're not playing chess anymore. *Archon* is the same way. So we said, we want to do a game in which we *can* do that without screwing it up," he says.

Other ardent *Archon* fans suggested that the game should

An Adept of Order summons a Gorgon (in box at upper right) for placement on Fire, Air, Water, or Earth in the Electronic Arts' game, Archon II: Adept.

allow you to be able to build your own armies, to play some of your opponent's types of pieces, to use magic spells more often, and to limit the edge given to players who happen to be agile with a joystick—without slowing down the game. Those ideas and much more have been incorporated into *Adept*.

In the game, you use your four Adepts—something akin to powerful wizards—to conjur and then maneuver monsters, cast spells against the enemy, and ultimately win by occupying the six flashing—*and moving*—power points.

While the basics are in many ways similar to the original game, *Adept* is a different game and has a number of interesting features: Energy must be monitored and expended carefully; the health of individual Adepts is crucial to your chances, and the various gorgons, wraiths, firebirds, sirens, juggernauts, giants, and other monsters are more or less effective depending on which of the four elemental bands on the game board they occupy: fire, air, water, or earth.

There is even an Apocalypse spell which at certain times can be used to begin the battle that ends the game.

"At the start, there are only four pieces on a side, the Adepts," says Freeman. "Everything else you add.

"You can concoct your own army to suit yourself. For instance, if you have trouble mastering certain pieces or you need practice on them, you don't have to use them. Don't summon them. Or, if you like some particular piece, that's all you can have. Or you can have a little of everything," Freeman adds.

"This is a game of, in part, resource management. You can cast as many spells as you want as often as you want. You can summon pieces from now to kingdom come—as long as you can pay for them. You pay in magical energy, and you get magical energy by occupying power points, which cycle from element to element each turn."

In designing *Adept*, the three creators came up with a particular piece which is especially nice for beginners not used to conducting battles with a joystick: the Siren.

"All you have to do with the Siren is push the joystick button—you don't aim, you don't move—just push the button," says Freeman. "And as long as you push the button, she sings. And as long as she sings, the other person's lifeline goes down.

"But you can't move while you're pressing the button, so you can't dodge. Whenever [an opponent] fires something and you think it's going to hit, you have to let go of the button and run. As soon as the missile's passed, you go back to holding down the button. For beginners, this piece is overwhelming. After a while, when you get used to everything else, then it's not nearly as good," he says.

On the other hand, the Chimera may be the most difficult piece in *Adept* to learn, Freeman adds. "The Chimera has three different attacks. It breathes fire, snorts a cloud of poison gas, and has a poison stinger in its tail. And all three of those attacks do different amounts of damage and require different ranges.

"That's a hard piece to learn. Beginners have trouble with it. But in *Adept*," says Freeman, "they don't have to use it until they've practiced."

Adept, now available for the Commodore 64 as well as Atari computers at a suggested retail price of $40, is not by any means the last program from Free Fall Associates. Now that they've recovered from the creation of *Adept*, there is already a list of possible projects a mile long, Freeman admits.

But there are only twenty-four hours in a day. Not even an Adept can change that.

Bryan Files

Beware of the evil genies determined to knock you from your magic carpet. With a little strategy and skill, you can trap them in bottles—but work quickly before they re-emerge. A lively arcade-style game for the VIC, we've added a version for the 64. A joystick is required.

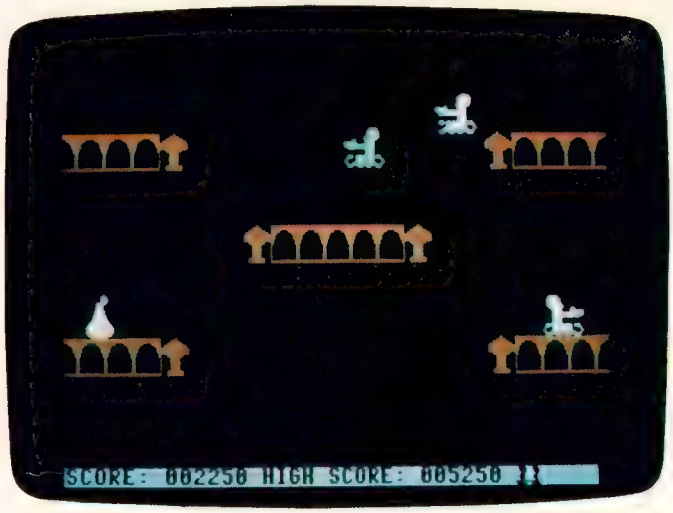
Flying through Bagdad on your magic carpet, you're suddenly accosted by some rug-riding evil genies bent on knocking you off—literally and figuratively. Your only defense is to knock them off first, and this takes some tricky maneuvering. First, you must trap each genie in a bottle. Then collect the bottles before the genies have a chance to escape. If you fail to collect a bottle in time, the lid opens and your battle resumes.

The Calm Before The Storm

Ridding the city of enemy genies gives you a brief rest before the next wave of more numerous and determined genies. Only white genies are encountered during the first four waves, but the fifth wave brings a new, more aggressive menace —the blue genies. (The 64 version plays a bit differently—see 64 Notes below.)

If you manage to reach the ninth wave, white, blue, and the dreaded purple genies emerge for a fast and furious battle.

Twelve is the maximum number of genies that will appear, but the difficulty increases with each higher level. You begin with four green genies (one on the screen, three in reserve), and a new one is added for each 4000 points scored. For each bottle collected, 250 points are awarded.



The player must swoop down to retrieve the bottle before the genie within escapes (64 version).

Current score and high score are continuously displayed in the VIC version.

Flying The Magic Carpet

To start a new game, push the joystick forward. Move the joystick (port 2 in the 64) left or right to move your genie correspondingly. Press the fire button to fly up, and release it to allow gravity to pull you down. Hovering requires alternately pressing and releasing the fire button. If you reach the top of the screen, your genie will bounce, however, he will wrap around the screen at the left and right edges.

Strategic positioning is extremely important. When two genies hit at the same level, they bounce off each other. You have to use your carpet to hit the other genies. If you're at a higher level when you collide, the edge of your carpet knocks the genie off his rug. The falling genie

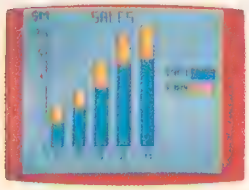
Release The Graphics Power Of Your Commodore 64™...

With A Pen.

Now there's a sophisticated graphics system for your C-64—the Koala Light Pen System™ from Koala Technologies. It's easy. You work directly on your computer screen to draw, design, chart graphs. The Koala Light Pen System is all you need.

A State-Of-The-Art Light Pen

We've packed all the electronics in the streamlined Koala Pen, using the most advanced miniaturization techniques. This means clearer, smoother, more precise graphics—and, unlike other C-64 graphics products, you can use the full range of the C-64's colors. It also has an easy-to-use tip-switch.

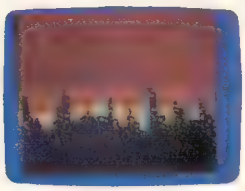


A Complete Graphics Package

Koala, well known for our graphics systems, has created the premier C-64 graphics package. It contains a complete array of graphics capabilities. In addition, you can dip into a palette of 16 colors—and over 3,000 textured patterns. Point to "mirror" and a kaleidoscope of colorful images bursts onto the screen. Zoom in for 320 x 200 resolution. "Rubber band" lines and shapes.

Explore the full graphics power of your C-64 with the Koala Light Pen System. There is no other system like it.

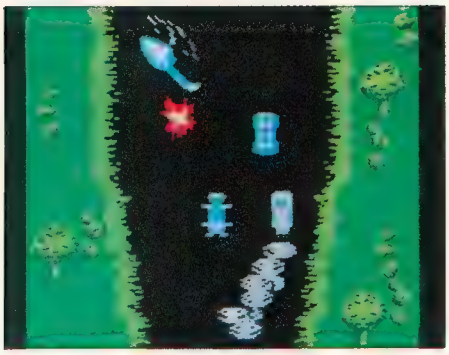
The Koala Light Pen System™ and Graphics 64 Software.™



Koala Technologies Corporation
800-KOA-BEAR

Commodore 64™ is a trademark of Commodore Electronics, Ltd.
© 1984 Koala Technologies.

OUR ARCADE GAMES WE BROUGHT



Bally Midway's Spy Hunter puts you in the driver's seat of the hottest machine on four wheels. You're after enemy spies. The situation is life and death. You'll need every weapon you've got – machine guns, and guided missiles, oil slicks and smoke screens. But the enemy is everywhere. On the road, in the water, even in the air. So you'll have to be more than fast to stay alive in Spy Hunter. You'll need brains and guts, too.

Do you have what it takes?

Bally Midway's Tapper would like to welcome you to the fastest game in the universe.

You're serving up drinks in some of the craziest places you've ever seen. And the service better be good, or else. You'll work your way through the wild Western Saloon to the Sports Bar. From there to the slam dancing Punk Bar and on into the Space Bar full of customers who are, literally, out of this world.!

Are you fast enough to play Tapper? If you have to ask, you probably already know the answer.

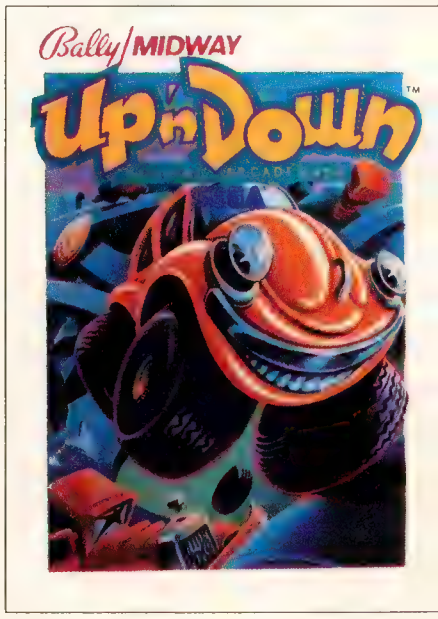
Bally Midway's Up 'N Down by Sega. In this game, a crash is no accident.

In fact, it's the whole object of the game. You'll race your baja bug over some of the worst roads south of any border. Leap dead ends, gaping canyons and oncoming traffic in a single bound. And if anyone gets in your way, crush 'em.

Crashing, bashing Up 'N Down. It's one smash hit that really is a smash.

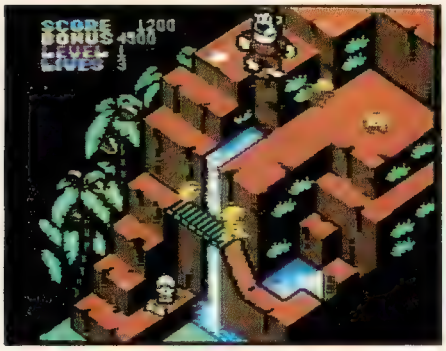
The #1 Arcade Game of 1984.

Nominated as Most Innovative Coin-Op Game of 1984 by *Electronic Games* magazine.



#1 Arcade Hit, *Play Meter* Conversions Poll, 8/1/84.

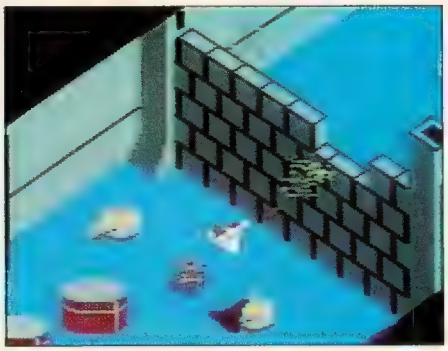
WERE SUCH BIG HITS, THEM HOME.



Sega's Congo Bongo rocked the home game world when it shot up to Number 3 on the Billboard chart this summer.

And now it's available for even more home systems. So check the chart and get ready for jungle action. You'll pursue the mighty ape Congo up Monkey Mountain and across the Mighty River. Do battle with dangerous jungle creatures. Ride hippos, dodge charging rhinos and try to avoid becoming a snack for a man-eating fish.

Congo Bongo. It's fast and it's fun. But be careful. It's a jungle in there.



Sega's Zaxxon. If you haven't played Zaxxon, you must have been living on another planet for the past few years.

And now the ultimate space combat game is available for even more home systems. You'll pilot a space fighter through force fields and enemy fire on your way to do battle with the mighty Zaxxon robot. Countless others have gone before you in this Hall of Fame game. But this time your life is in your own hands.

Zaxxon killed them in the arcades. But compared to what it will do to you at home, that was child's play.

	SPY HUNTER	TAPPER	UP 'N DOWN	CONGO BONGO	ZAXXON
Atari 2600 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓
Atari 5200 cartridge				✓	✓ NEW
Atari Computers* cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Atari Computers† diskette	✓ NEW	✓ NEW	✓ NEW		✓
ColecoVision & ADAM cartridge	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Commodore 64 cartridge	✓ NEW	✓ NEW	✓ NEW	✓	✓ NEW
Commodore 64 diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
Apple II, IIe, IIc diskette	✓ NEW	✓ NEW	✓ NEW	✓ NEW	✓
IBM PC diskette	✓ NEW	✓** NEW	✓ NEW	✓** NEW	✓** NEW

✓ Published by Sega Enterprises, Inc.
✓ Published by Datasoft, Inc. under license from Sega Enterprises, Inc.
✓ Published by Coleco Industries, Inc. under license from Sega Enterprises, Inc.
✓ Published by Synapse Software Corporation under license from Sega Enterprises, Inc.
*Atari 400, 800, 600XL, 800XL and 1200XL. (Congo Bongo cartridge: 400, 800 and 800XL.)
†Atari 800, 600XL, 800XL and 1200XL.
**Also available for IBM PCjr.

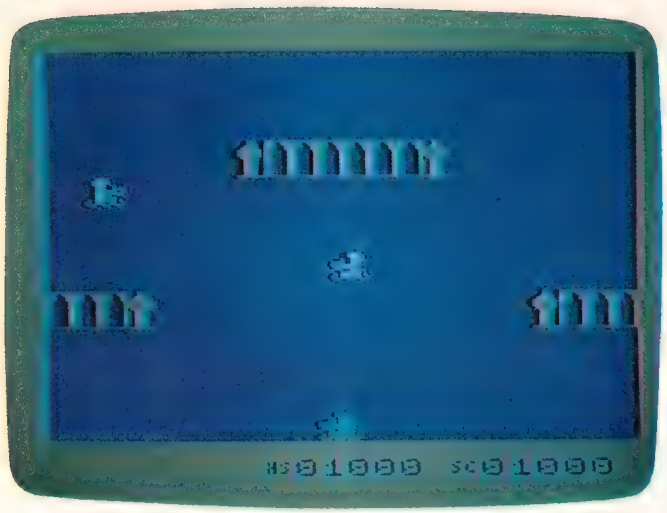
All new games are scheduled to be in your stores for Christmas. Check your local dealer.

©1984 Sega Enterprises, Inc.

[1]Number of game levels varies on cartridges for Atari and Commodore systems. Atari, 2600, 5200, 400, 800, 600XL, 800XL, and 1200XL are trademarks of Atari Corporation. Commodore 64 is a trademark of Commodore Electronics, Inc. ColecoVision and ADAM are trademarks of Coleco Industries, Inc. Apple, II, IIe, and IIc are trademarks of Apple Computer, Inc. IBM, PC and PCjr are trademarks of International Business Machines Corp. UP 'N DOWN is a trademark of Sega Enterprises, Ltd., manufactured under license from Sega Enterprises, Ltd., Japan. Videogame copyright ©1983 Sega Enterprises, Ltd. BALLY MIDWAY is a trademark of Bally Midway Mfg. Co. Package and program copyright ©1984 Sega Enterprises, Inc. TAPPER and SPY HUNTER are trademarks of Bally Midway Mfg. Co. Videogame copyright ©1983 Bally Midway Mfg. Co. All rights reserved. ZAXXON is a trademark of Sega Enterprises, Inc. Copyright ©1984, Sega Enterprises, Inc. CONGO BONGO is a trademark of Sega Enterprises, Inc. Copyright ©1983, Sega Enterprises, Inc.

Arcade and Home Smash. Hit #3 on *Billboard* magazine's Top Video Games survey.

One of only ten games ever to make *Electronic Games'* Hall of Fame.



The evil genies hover while the good genie is reincarnated (VIC version).

then crawls back into his bottle, which falls to the ground (or to one of the intermediate levels).

Once in the bottle, the evil genie begins to work his way out again. The only way to get rid of him is to fly down and pick up the bottle.

If you hit a genie when you're at a lower level, you're the loser. You don't have a bottle, you simply lose one of your genies. You'll reincarnate at the bottom of the screen, providing you have at least one life remaining. During the three or four seconds the genie is flashing, he cannot be defeated by enemies. However, if no genies are nearby, you can terminate the flashing and begin play by moving the joystick.

Important VIC Instructions

Since "Bagdad" uses the entire memory of the unexpanded VIC (including the stack and screen memory), it must be entered in three parts. Program 1 is written in BASIC and is entered in the normal manner. Program 2 represents replacement lines for tape users (see below), and Programs 3 and 4 are written in machine language and require the use of MLX (elsewhere in this issue). *At least 8K memory expansion is required to run MLX.*

Follow these instructions carefully to enter and save the program:

1. Type in and save Program 1. If you're using tape, replace lines 32–59 of Program 1 with those shown in Program 2. After saving, *do not rewind the tape,* but remove it from the Datassette. You might want to save a copy onto two different tapes or disks.

2. Turn your VIC off and back on to reset the machine. Install your 8K (or greater) memory expander.

3. Type the following statement in immediate mode (no line number) then press RETURN:

POKE 648,26:SYS 58648:POKE 44,28:POKE 7168,0:NEW

This moves screen memory to 6656, and puts the beginning of BASIC just above the screen, to leave room for the ML program.

4. Load and run the VIC MLX program. Answer the MLX prompts as follows:

starting address: 4096
ending address: 6144

5. Enter and save the second part of Bagdad (Program 3). Disk users must save the program with the filename "B" (make sure you don't already have a file with this name). If you're using tape, save the data on the same tape you used for Program 1, immediately following that program. Again, do not rewind the tape, but remove it from the Datassette.

6. Turn your VIC off and on to reset the machine. Leave the 8K expander in place.

7. Type the following statement with no line number, then press RETURN:

POKE 44,33:POKE 8448,0:NEW

Screen memory is now back at 4096, and BASIC begins at a location in the memory expander, to free up memory for the second ML program.

8. Load and run MLX again and answer the prompts as follows:

starting address: 6144
ending address: 8192

9. Enter and save the third part of Bagdad (Program 4). If you're using disk, you must save this data with the filename "C". For tape, use the same cassette you used for the first and second parts, and save the data immediately following the previous part (Program 3).

You now have all the programs necessary to play Bagdad. Turn off the computer and remove your memory expander. Bagdad is now configured to run only on the unexpanded VIC. To begin, simply load and run the first program. After viewing the game instructions, the remaining machine language will be loaded automatically. If you'd rather not type in the programs, I'll make a copy (VIC version only) on receipt of a blank tape, self-addressed stamped mailer, and $3. Write to:

Bryan Files
404 Eastbrook Lane
O'Fallon, MO 63366

64 Notes

The 64 version of Bagdad is somewhat different from the VIC version, although the game concept is the same. You begin with three lives (compared to four in the VIC version). The maximum number of enemy genies in one wave is seven, and a new life is added every 5000 points. The *tenth* level introduces the first blue genie, and the *fourteenth* level debuts the sinister purple genie. High score is displayed only at the end of each game.

As in the VIC version, MLX is required for typing in Bagdad (Program 5). Follow these instructions carefully:

1. After turning your 64 on, type POKE 44,32:POKE 32*256,0. Press RETURN.
2. Type NEW, press RETURN, then load and run MLX.
3. Respond to the prompts with:

   starting address: 2049
   ending address: 6020

4. Type in Program 5, save it, turn off the computer to reset the pointers, then load and run.

See program listing on page 178.

☐ **SPELLING SPACE WARS**—Provides a great way to study those weekly spelling lists brought home from school. Children just type in the words and get set for the fast-paced, arcade-style adventures of Scrambled Spaceships and Zirk Invasion.

☐ **KIDS ON THE COMMODORE**—A comprehensive learning guide for young users of the COMMODORE 64. Children are taught the function of each keyboard key, the fundamentals of disk operation (formatting, saving, back up, maintainence), and the beginning major structures and concepts of the Basic language. A must for young users!

☐ **STATE CHASE**—Contains a trio of action-packed games designed to introduce, teach and help children master information about the fifty states. Such state facts as location, region, name, nickname, abbreviation, & capital are presented in a fun-filled manner.

☐ **BEGINNING YEARS**—Set in a theme of Mother Goose rhymes, and full of bright colorful graphics and plenty of action, young children are taught shape and color recognition, sequencing and recognition of alphabet letters, and number recognition and counting. Activity booklet and parent suggestion list provided.

SATISFACTION GUARANTEED OR YOUR MONEY BACK.

SUNGEM® Dept. CG 410, 900 W. Los Vallecitos, San Marcos, CA 92069 (619) 744-2011

START MY CHILD LEARNING TODAY!

☐ **Order by mail or phone.** Each educational adventure is available only on Diskette at the low price of $23.95! Include $1.50 postage & handling; CA Residents add 6% sales tax. VISA and MASTERCARD welcome.

☐ **Send me your free Color Brochure.**

NAME _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

"COMMODORE 64" is a trademark of COMMODORE BUSINESS MACHINES, INC.

Jump!

Fernando Ciccarelli and Marcel Ferreira

Fire your laser and defend your planet from the invading Ryiads in this keyboard-controlled game for the VIC and 64.

"Jump!" pits you against an invader who's trying to blast both you and your planet. He's wily and you must use your laser in defense.

When you hit the invader, a Ryiad, you get 50 points and 25 energy units. When a Ryiad shot hits the surface of your planet, the point of impact is illustrated by reversing the damaged character. When he hits it a second time, a crater is formed. If he hits the same spot a third time, it disappears and you lose 25 points.

You can move over the undamaged and slightly damaged areas of the surface, but you lose a turn if you try to move over craters or pits. Move left by holding down the Z key. To move right, hold down the C key.

Avoiding The Pits

You can bypass craters and pits by jumping over them. Pressing SHIFT Z allows you to jump over an empty spot to your left. To jump to the right, press SHIFT C. Fire your laser by pressing X, SPACE, or RETURN.

As you play, you'll notice that your energy units are constantly ticking away. Standing still costs one energy unit per second, moving costs five, and jumping costs ten. You get a total of three turns.

Five Difficulty Levels

There are five difficulty levels: Beginner, Rookie, Pro, Expert, and Random. Try Beginner just to see how the game plays. When you're comfortable with that level, go on to Rookie. Pro is the major level; it gives you a fair game. At the Expert level, the Ryiad is smart and fast. In the Random level, the difficulty factor is chosen randomly for each invader.

If you would like a copy of the program (VIC version only), send a SASE with a blank tape and $3 to:

Fernando Ciccarelli
14 Poplar Place
New Rochelle, NY 10805

See program listings on page 173.

A life is lost during this direct hit in the VIC version.

To cross either of the holes made by the invader, you must remember to jump (64 version).

F-15 STRIKE EAGLE

Put a $20,000,000 Thrill in your Computer!!!

The F-15 STRIKE EAGLE, one of the world's most sophisticated fighters, costs the Air Force more than $20,000,000.00 each. Now you too can strap into your ejection seat and prove how good you really are in exciting modern jet fighter combat. Fly combat missions, engage enemy aircraft, and destroy enemy ground targets from historic missions over Southeast Asia to today's defense of the strategic oil routes through the Straits of Hormuz.

F-15 STRIKE EAGLE (simulator) has all the features that makes the real EAGLE the great fighter aircraft it is — afterburners, multiple radars, air to air missiles, high explosive bombs, cannon, drop tanks, Electronic Counter Measures (ECM) flares, electronic ground tracking maps, Heads Up Display (HUD), outstanding 3-dimensional cockpit visibility, and realistic F-15 maneuverability. Your mission is to take off from your base, fly to and destroy your primary target through all the dangers of enemy territory including Surface to Air Missiles and enemy aircraft. Of course, you have to get back home again, too!!

F-15 STRIKE EAGLE is a very real simulation, accomplished with the guidance of real fighter pilots, and includes seven different combat missions, four skill levels, and an infinite number of exciting scenarios. F-15 will thrill and challenge you and give you the chance to prove you have the "Right Stuff" of an EAGLE fighter pilot!!

F-15 STRIKE EAGLE is available for Commodore 64, ATARI (48K), and Apple II (64K) computers. Suggested retail price is only $34.95. Find STRIKE EAGLE at your local retailer, or call or write for MC/VISA, or COD orders. Add $2.50 for Postage and Handling (Int'l add $4.00USD). MD residents add 5% sales tax.

Experience the reality of these other great simulations from MicroProse

As close to the Real Thrill of Flying as You Can Handle!!!

Heart Pounding Accelerated Real-Time Defense of Europe Against Soviet Invasion!!!

Sensational Assault Chopper Rescue Raids for Daring Pilots!!!

MicroProse Software

The Action is Simulated — the Excitement is REAL!!

10616 Beaver Dam Road
Hunt Valley, MD 21030
(301) 667-1151

Commodore 64, ATARI, APPLE, and IBM are registered trademarks of Commodore Business Machines Inc., ATARI Inc., APPLE Computer Inc., and International Business Machines Inc., respectively.

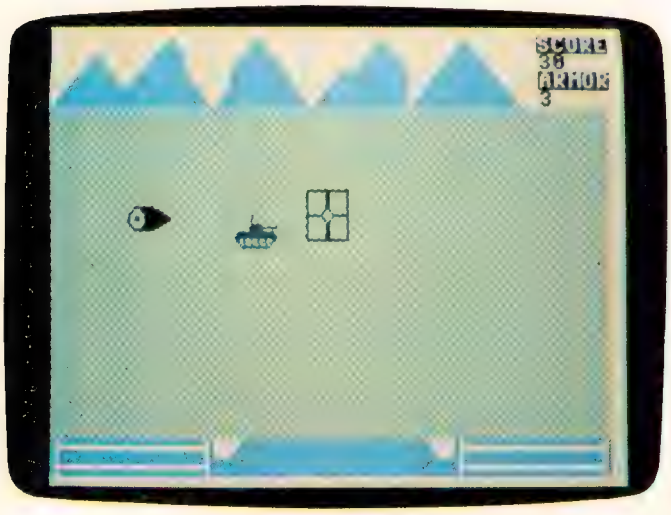
Supertank

Boris Litinsky

In this unusual action game for the 64, your goal is to prevent hostile tanks from crossing into your territory. By aiming carefully and avoiding direct hits, you may make it to the rank of Marshal.

Your orders are to stop the enemy tanks. But in the back of your mind, you know there's more to it than just following orders. You know that if you don't stop them, they'll stop you. Your goal is simply to survive.

Your commander has been kind enough to give you a choice of three different tanks. The Tiger has strong armor, which is great for helping you survive, but it moves sluggishly. The T-34 has moderate armor and speed, but lacks firepower. If you choose the Sherman, you'll have a quick tank with a good cannon, but almost no defense (armor). If you're a new recruit, you might want to choose the T-34 because of its defensive capabilities. Advanced players who are sure of their abilities may prefer the Sherman, although a single hit by the enemy can be devastating.



A missile flies toward the opposing tank.

Controlling The Tank

After you are outfitted, your tank moves onto the battlefield. Enemy tanks move across the screen from left to right. Using the joystick to control the crosshairs of your cannon, get the tank in your sights, and press the button to fire a salvo. Remember that it takes time for the missiles to travel; you'll have to adjust your shots accordingly, shooting slightly in front of your target.

After pressing the fire button, you'll see the missile fly (from the left edge of the screen). If it misses, nothing will happen. But if it hits its target, the enemy tank will explode and the screen will change color, to simulate new terrain and new weather. You score ten points for each successful shot.

If you miss, you become the target. The enemy tank will turn toward you and fire. The enemy rarely misses—and you'll lose one armor point when you get hit. In the upper right corner is a status indicator which displays how many points you've scored and how much armor you have left. When your defenses reach zero, your tank is destroyed. The windshield cracks, and the tank is reduced to scrap.

Extra Chances

Losing a tank is not a total catastrophe, however. You manage to escape by the skin of your teeth, and make your way back to headquarters. Based on performance, you are awarded a rank from Private (less than 50 points scored) to Marshal (over 1000). But if no points are scored, you're branded a Traitor. Whatever your rank, you are given another chance to go forth and do battle. Choose another tank and the game begins again; you may yet earn the exalted rank of Marshal.

See program listing on page 170.

Booted up any good books lately?

Disks for
Apple II® series and Commodore 64.™

Introducing Trillium™ interactive software.

Maybe you've wondered what kind of software a giant like Bradbury or Crichton or Clarke could dream up. Maybe you've wondered what it would be like to be the hero in one of their mind-boggling adventures.

Or maybe you've just wondered if you'd ever see software that knocks you right out of your seat—and literally lands you in a whole new world.

Well, now you can stop wondering. Because now there's Trillium. An entire line of games produced in collaboration with the greatest science fiction authors of our century.

An entire line of the most challenging, most exciting, most rewarding adventures ever created. Adventures that put you right in the center of action—and completely in command.

Only Trillium gives you programs like **Fahrenheit 451™**, Ray Bradbury's timeless masterpiece about one man's courage to defy a book-burning, repressive state. Only Trillium combines a line of classic fiction with state-of-the-art interactive features—features like full-color graphics, advanced text parsers, and the intense, realistic game play of multiple-disk programs. And only Trillium gives you these benefits in every single game.

Trillium. We give you more than great software.

We give you great books to boot.

TRILLIUM™

© 1984, Trillium Corp All rights reserved. Apple is a registered trademark of Apple Computer, Inc. Commodore 64 is a trademark of Commodore Industries, Ltd
SHADOWKEEP, RENDEZVOUS WITH RAMA, DRAGONWORLD, AMAZON and FAHRENHEIT 451 computer programs are trademarks of Trillium Corp

Descent To Kaylon

Steve Stiglich

Gliding asteroids and a layer of clouds separate you from your supply base on Planet Kaylon. Is safe passage possible? For the VIC and 64.

Cruising over Planet Kaylon in your spaceship, you spot a supply base below. But as soon as you send off a shuttle ship to the base, a cluster of asteroids sails across its path. Darting quickly through the asteroids and clouds, your shuttle narrowly escapes collision before touching down on Kaylon.

This fast paced, arcade-style game uses the full potential of the unexpanded VIC, and is entertaining on the 64 as well. There are as many levels of play as you can master, and the program automatically records the high score after each game.

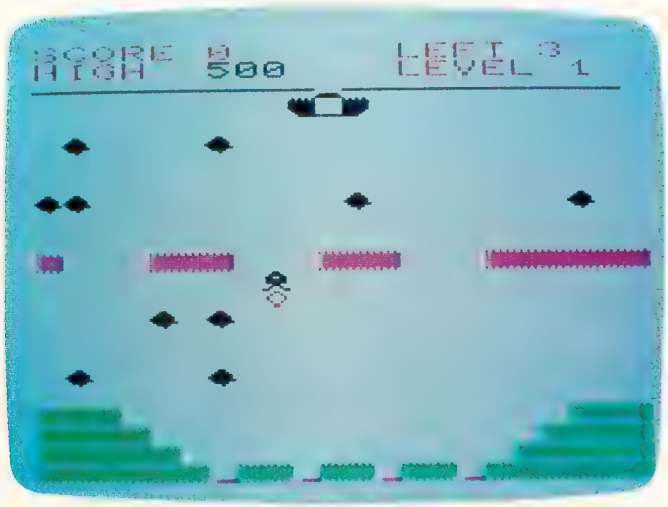
"Descent To Kaylon" begins with your spaceship moving across the top of the screen. To release a shuttle, press the space bar. Your shuttle will begin moving downward through the layers of asteroids and clouds. Pressing A moves it to the left, and D to the right. You can also hold your shuttle at one latitude by pressing the space bar.

There are four landing pads on Kaylon. For each shuttle that you safely land, you earn 100 points. Landing four shuttles on the base advances you to the next level, and adds to your score a bonus of 100 points times your level. With each increasing level, more asteroids are added to the screen.

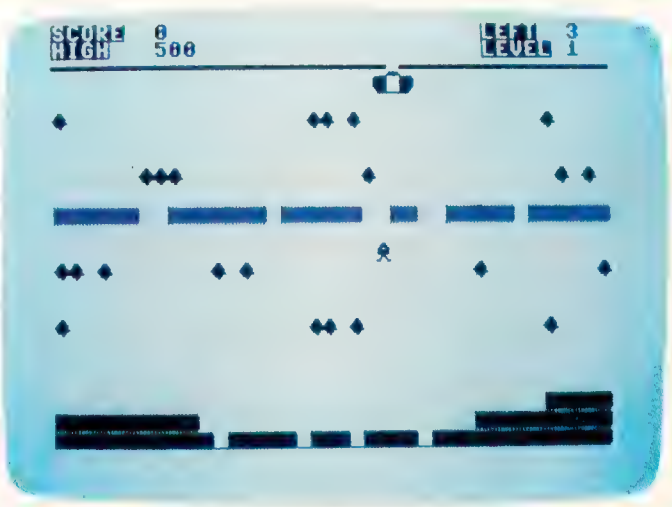
If your shuttle collides with a cloud or asteroid, you can start again at the top of the screen. After three of your shuttles have collided, though, the game ends. With the demise of your last shuttle, the instructions are reprinted, the high score is updated, and you're given a chance to replay.

Variable Names

V	= Volume for sound generators (VIC version only)
S1	= Sound generator for VIC
SD	= Sound generator for 64



Having traversed the layer of clouds, this shuttle must now dodge some asteroids (VIC Version).



In the higher levels, more asteroids move across the screen (64 version).

Flight Simulator II

For the Commodore 64™

Put yourself in the pilot's seat of a Piper 181 Cherokee Archer for an awe-inspiring flight over realistic scenery from New York to Los Angeles. High speed color-filled 3D graphics will give you a beautiful panoramic view as you practice takeoffs, landings, and aerobatics. Complete documentation will get you airborne quickly even if you've never flown before. When you think you're ready, you can play the World War I Ace aerial battle game. Flight Simulator II features include ■ animated color 3D graphics ■ day, dusk, and night flying modes ■ over 80 airports in four scenery areas: New York, Chicago, Los Angeles, Seattle, with additional scenery areas available ■ user-variable weather, from clear blue skies to grey cloudy conditions ■ complete flight instrumentation ■ VOR, ILS, ADF, and DME radio equipped ■ navigation facilities and course plotting ■ World War I Ace aerial battle game ■ complete information manual and flight handbook.

See your dealer . . .

or write or call for more information. For direct orders please add $1.50 for shipping and specify UPS or first class mail delivery. American Express, Diner's Club, MasterCard, and Visa accepted.

Order Line: 800/637-4983

subLOGIC Corporation
713 Edgebrook Drive
Champaign IL 61820
(217) 359-8482 Telex: 206995

LF	= Number of ships left
PO	= Position of shuttle
C	= Location of color RAM under screen position
M$(1) and M$(2)	= Two characters used to make the strings of asteroids
A$, B$, C$	= Three strings of asteroids printed on the screen
HI	= High Score
LV	= Level of play

Program Description (VIC Version)

0–1	Reserves character set; changes screen color; enters special character mode.
6–30	Resets most variables.
49–59	Creates strings of asteroids, with increasing difficulty at each level of game.
98–106	Sets up play screen.
190–192	Moves spaceship across the top of screen; checks keyboard for input.
219	Moves the strings of asteroids in the appropriate direction.
227–233	Checks keyboard for input.
350	Collision check.
500	Determines what you have collided with.
510–511	After collision with obstacles, decreases remaining shuttles by one. If no shuttles remain, GOTO 1200.
600–603	Increments score when you land on base.
700–712	Calculates bonus according to level of play.
1200	Sets high score.
1201–1215	Prints Game Over message and instructions.

See program listing on page 176.

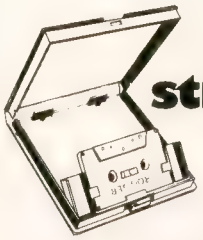
COMPUTER & SOFTWARE PROTECTION

Dealer & Distributor Inquiries Invited

K-COVER

An anti-static, unbreakable, Commodore keyboard protector.

FP884H with hinges - $9.95 ea.
FP883 without hinges - $7.95 ea.



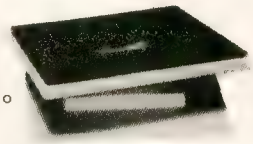
strongbox

HOLDS UP TO 8 DISKETTES & MANUALS

SP-1200 DISKETTE
SP-1202 CASSETTE $2.95 ea.

Both available with EMI shield - $4.49 ea.
COLORS - Black, Grey, Blue, Green, Yellow, Almond, Melon

UNIVERSAL MONITOR STAND
TILTS 25° & SWIVELS 360°



MODEL 1400 Universal - $29.95 ea.

Penguin Products
P.O. Box 7008
Roseville, MI 48305-7008

INCLUDE $1.50 SHIPPING
CHECK, MONEY ORDER, VISA & MASTERCARD ACCEPTED.
Call toll-free 1-800-732-0614
In Mich. (313) 774-2228

"STILL #1 FOR THE COMMODORE 64™"

We've totally improved *THE CLONE MACHINE*™ to bring you the finest back-up & utility program available for your system. Back-up all types of files including relative files, display & edit track/blocks in Hex or ASCII, alter directory, plus new *SUPER CLONE*™ that provides one of the fastest copies known to date. Our *SUPER UNGUARD* which replaces the standard Unguard, allows you to easily do errors 20, 21, 22, 23, 27, and 29 without any disassembly of your drive (like some competitors' products suggest) and it works much more efficiently and faster than the now obsolete Unguard. We've added some new tricks which we didn't even know were possible, to allow you to back up what was formerly considered uncopyable by any means. Don't worry about your old obsolete Clone Machine because as long as you have registered your postcard with us, the new version is available for only $10 plus shipping and handling.

STILL ONLY $49.95

Check out these other fine Utility products

MR TESTER™ — A product that can test your complete Commodore™ system (including memory, joysticks and ports, 1541 drive load and save, SID chip, printer, screen and color display, recorder, plus more). A necessary addition to your software library that adds the assurance of a correctly operating system. — ONLY $29.95

SCREEN DUMPER 64™ — How would you like to print what's on the screen (including hi-res graphics, text, multicolor sprites, and even what you have drawn with your *KOALA PAD**)? Well this utility will easily transfer what's on the screen to your Commodore printer or other type matrix printer* by simply pressing the proper key sequence. Best of all, this program was designed to reside in a hidden area that will not steal memory from most programs allowing Screen Dumper 64 to be loaded along with many of the popular graphic software and games. That means it's easy to print out your favorite screens, business graphics, and/or text while your program is up and running. — A BARGAIN AT ONLY $29.95

*Standard matrix printers require an intelligent graphics interface such as the Micro-World MW-350, Tymac Connection, or others.

FANTASTIC FILER™ — A thorough data base program that holds an average of 1000 records per disk. Fast access time with full menu driven subsections. A virtual steal at only $29.95

Available from Micro-W. DISTRIBUTING, INC. 1342B Route 23 Butler, New Jersey 07405 201-838-9027

Dealer & Distributors Inquiries Invited

CAN FLYING FEET AND FISTS CONQUER THE EVIL WIZARD'S FORTRESS?

What's it like to have the lightning feet and fatal fists of Bruce Lee?

You'll find out in this death-defying game.

You have to kick, slash and punch your way through an array of deadly chambers. Where the brutal Green Yamo, terrible Ninja, exploding bushes and other dangers lurk.

Even if you survive all that, the Evil Wizard is waiting to do you in with an arsenal of flaming fireballs.

Destroy him and his fortune is yours.

Now, have you got what it takes to play Bruce Lee?

For Commodore 64, Apple II, Atari and IBM PC & PC/JR systems.

FAMOUS FACES™

Datasoft®

WE CHALLENGE YOU.

Datasoft, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311 • Phone (818) 701-5161

Datasoft® is a registered trademark of Datasoft, Inc.® Famous Faces™ is a trademark of Datasoft, Inc.® 1984. Bruce Lee™ is a trademark of Linda Lee, © Bruce Lee 1984, all rights reserved. © 1984 Datasoft, Inc.

A Look At New Books From "Reggie" D'Ignazio

Fred D'Ignazio, Associate Editor

A Peek In The Mirror

I'm a magazine columnist. That means that every month I get the opportunity to climb up a mountain, grab a bullhorn, and harangue thousands of GAZETTE readers.

Some months I take a look at new products that have caught my fancy. Other months I tell you about all the foolishness that goes on around my house, with our kids and computers. And some months I get philosophical, and spin off ideas and opinions I hope will stimulate and provoke you.

Until a couple weeks ago, when I got up and made my speech to you each month I never thought about how I must look to you. Then I got a letter from Dallas Denny of Nashville, Tennessee. Dallas enclosed the June 1984 issue of the *Nashville Commodore Users Group (NCUG) Magazine*. On page 5 was a piece by Dallas entitled, "On the Road with Reggie D'Ignazio." The title of the piece comes from my column in COMPUTE! magazine entitled. "On the Road with Fred D'Ignazio." And the piece parodies my columns in various COMPUTE! publications. I'd like to share it with you here:

On the Road with Reggie D'Ignazio

There is a place in my house where you or I can go zooming into the sky like a jet fighter pilot with a fine mustache, or feed peanuts to the elephants at the zoo, or figure out our budget for Christmas presents for Aunt Patsy and Uncle Roger, or play tic-tac-toe with someone who lives in a cloud. It is a magical, exciting place. It does not have fancy curtains or decorations, or even a rug on the floor, but in it my neighbor's children have killed nasty green aliens from space, and in it they have made friends with men in red-and-white-striped balloons. It is a place where there is a television screen, but where television never comes. It is a place which is filled with wonderful sights and sounds.

The place that I am talking about has a lot of outlets to plug things into. You can plug things into slots in the floor or the wall, or dangle them from the lightbulbs on the ceilings. It has a desk with lots of interesting things: there are pencils without erasers and pens without caps, staples, rulers, ink, paper clips, rubber bands, razor blades, harmonicas, matchbooks from faraway places, batteries, note pads, stamps, out-of-date prescriptions, envelopes, guitar picks, pocketknives, screws, rolls of tape, and expired identification cards.

On the desk in my place sits a computer. It is not a particularly big computer, or a particularly tiny computer; it is just a computer. But my computer is a ticket on Lufthansa Airlines. It is a letter from my grandmother. It is a vacation trip to Disneyland. My computer is a lifetime subscription to National Geographic Magazine. *It is a paper cup telephone that connects me with my friends. It is a notebook on which I can scribble my thoughts. It is dinner for two at Andre's. It is a reunion with an old friend, it is a coloring book, it is a safari to Africa.*

There are places with computers like mine all over America, all over the world. Magic places. And ... who knows? Maybe there are similar places on Betelguese, Sirius, or Proxima Centauri. If there are, do you think we could arrange a software exchange?

When I read Reggie's "column," I laughed and winced—at the same time. Do I really sound like Reggie to you readers out there?

I would welcome hearing more from Reggie and from any other "Fred D'Ignazio" clones and lookalikes that you can invent. In the future, I

Educational Software
That Works:

Spell.

Spell It!

Spell expertly 1000 of the most misspelled words. Learn the spelling rules. Improve with 4 exciting activities, including a captivating arcade game! Add your own spelling words.

ages 10 — adult / 2 disks: $49.95

Math.

Math Blaster!

Master addition, subtraction, multiplication, division, fractions, decimals and percentages — by solving over 600 problems. Learn your math facts with 4 motivating activities, including a fast-action arcade game! Add your own problems.

ages 6 — 12 / 2 disks: $49.95

Word.

Word Attack!

Add 675 new words to your vocabulary — with precise definitions and sentences demonstrating usage. Build your skills with 4 fun-filled activities, including an arcade game! Add your own words.

ages 8 — adult / 2 disks: $49.95

Read.

Speed Reader II

Increase your reading speed and improve comprehension! Six exercises designed by reading specialists vastly improve your reading skills. Chart your own progress with 35 reading selections and comprehension quizzes. Add your own reading materials.

high school, college & adult / 2 disks: $69.95

The Davidson Best Seller Tradition.

For your Apple, IBM or Commodore 64.
Ask your dealer **today**.

For more information call: (800) 556-6141
In California call: (213) 373-9473

Davidson & Associates
6069 Groveoak Place #12
Rancho Palos Verdes, CA 90274

Davidson.

teacher certified NEA™

Apple, IBM and Commodore 64 are trademarks respectively of Apple Computers, Inc., International Business Machines Corp., and Commodore Business Machines, Inc.

plan to publish the best "columns" I receive. Then I'll ask you if you can tell the difference between the real Fred D'Ignazio and his artful imposters. I have the embarrassing suspicion that separating Freddie and Reggie D'Ignazio will not be that easy.

A Potpourri Of Books

Every month I receive dozens of books about computers, robots, and high technology. I read through the ones that look like they would interest me. I'd like to share the best of these with you.

I've grouped the books by topic. First, *introductory books*. There are thousands of these on the market. One of the most current and most readable is George Beekman's *The Commodore 64 Home Companion* (Datamost, 1984, $19.95, 359 pages, index, appendices).

Unlike many so-called "beginner's" manuals, Beekman's book is truly accessible, attractive, and *inviting*—for the entire family. It's a great alternative to a user's manual. It should appeal to both the young and old non-technical members of the family.

Also, the book is comprehensive. It begins by introducing you to the applications home computers can perform. Then it takes you, step by step, into buying software and hardware, setting up a system on your own, programming, and dealing with peripherals like modems and printers. The book ends up with a solid index, a list of user groups, and a handy pull-out summary card with BASIC commands, how to LOAD and RUN a program, how to SAVE a program, how to view the disk directory, how to format a disk, how to control the screen, and how to use a modem.

The second introductory book I'd like to recommend is *Computer FUNdamentals*, by Barbara Kurshan and Nancy Healy (Reston, 1984, $16.95, 208 pages oversized).

Computer FUNdamentals is a big activity book, equally suitable for families and schools. Each chapter begins with a brief look at such topics as computer history, programming, and computer applications. Most of each chapter, however, consists of activities, and *many of the activities don't require a computer*. For example, you can assemble your own computer out of an egg carton and write programs for it. Or you can create a junk robot out of shoe boxes, bits of tin foil, and markers. There are dozens of activities. All are attractive and easy to do, and they all teach some aspect of using computers. At the end of the book is a "keys and answers" section that gives the solutions to computer problems in the book.

Computer FUNdamentals makes an excellent introduction to the broader, more practical aspects of "computer literacy" for children ages 8 to 13.

As a companion to *FUNdamentals*, I would recommend *The Beginner's Computer Dictionary* by Elizabeth S. Wall and Alexander C. Wall (Avon/Camelot, 1984, $2.25, 80 pages, paperback). This is a straightforward reference book and complete guide to computer terms for children grades 4 and up.

For younger children, I'd recommend *The Computer Alphabet Book* by Elizabeth S. Wall (Avon/Camelot, 1984, $2.25, unpaged).

This is a sprightly little book designed to be used by beginning readers in 1st, 2nd, and 3rd grade, and to be read by parents to younger children. When you browse through the book, you see that on the left side you have a big letter of the alphabet, followed by a computer term and a brief explanation. On the right side (on the facing page) is a cartoon of a silly, Snoopy-like dog learning about computers.

This book has a laudable, secondary purpose. As parents read it to their children, they may also be acquiring a painless dose of computer literacy themselves, including information about the computer's memory, programming languages, computer parts, computer applications, and fundamentals about how people actually use computers. If you find other computer manuals too scary and technical, then this is the book for you.

A companion package to Wall's *Alphabet Book*, or a possible alternative, is a book/software package, *Qwerty's Alphabet Adventure* by Shadow Lawn Press (Hayden, 1984, $19.95, 4-color unpaged book, Commodore 64 diskette).

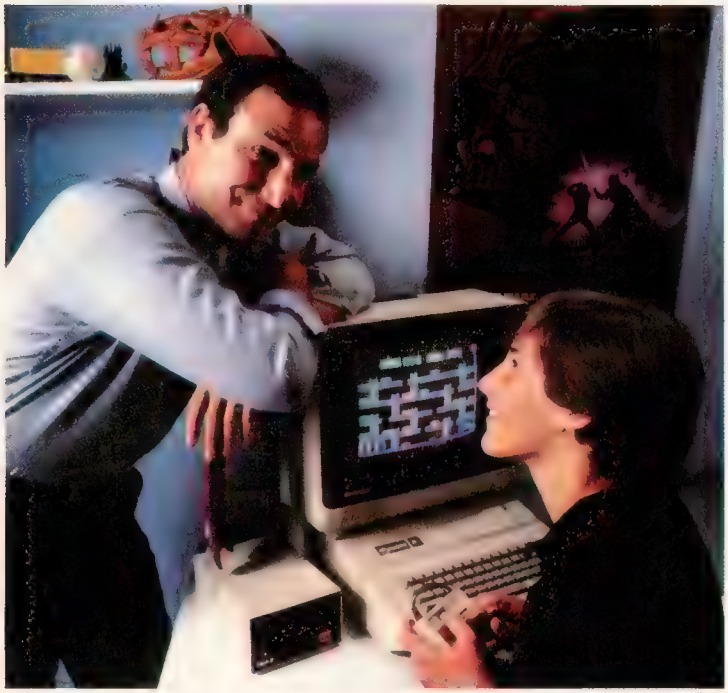
Qwerty is a cute little caterpillar who takes your child on a journey through the letters of the alphabet. The pictures on the computer screen are extremely simple, but the Qwerty character and the illustrations in the Qwerty book compare favorably with other alphabet books for children.

I like Elizabeth Wall's *Alphabet Book* and *Qwerty's Adventure* because picturebooks, stories, and cartoon characters are a familiar and comfortable way for young children and their parents to begin learning about computers. In addition, the Qwerty package combines storytelling and books with a hands-on introduction to the computer keyboard.

Puzzles And Adventures

Computers can act like workhorses and number crunchers, but they can also stimulate our imagination, and help strengthen our thinking skills. I welcome any books and programs that open up this dimension of computers to new users—especially children.

Give your children more than the advantage of a computer. Give them the Scholastic Advantage.



You probably realize the computer is only the first step. Now you need Scholastic Software to turn it into both a powerful and entertaining learning tool for your child.

Scholastic Software is the only software that comes with the Scholastic Advantage. This means software which uses your child's own natural curiosity and love of adventure to make learning valuable skills fun. Software based on what your child is actually studying in school, which makes it relevant and practical. And software which is already being used successfully by millions of kids in schools around the country.

At Scholastic, we've put everything we've discovered about how youngsters learn into our new software line. It's the result of over 60 years' experience making learning both challenging and fun. In fact, you probably grew up reading Scholastic books and magazines in school. Nobody else knows kids like we do and it shows in our new family of products. That's the Scholastic Advantage.

Our software family includes *Agent U.S.A.,* which turns geography into an exciting adventure trip around the country; *Story Maker,* a program that helps kids create their own illustrated story book, and *Math Man,* an action game that makes learning math fun. *Microzine* is America's most popular classroom software, featuring four fun learning programs on one disk. *Story Tree* is both a creative writing tool and a word processor, and *Operation: Frog* is a fascinating simulation of a biology lab.

So give the Scholastic Advantage. You'll be surprised how fast the computer becomes one of your child's favorite—and most exciting—teachers.

Agent U.S.A. available in Apple, Atari, Commodore and IBM. Story Maker and Microzine available in Apple. Math Man and Story Tree available in Apple and IBM. Operation. Frog available in Apple and Commodore. Spelldiver available in Apple, Atari and Commodore.

Clip this and save $5.00 on any purchase of Scholastic Software!

Not a store coupon. Redeem by attaching dated cash register receipt and warranty card. Send to: Scholastic Software, Dept. C.M., 730 Broadway, New York, NY 10003.

Name_____

Address_____

City_____ State_____ Zip_____

Store name_____

Product purchased_____ Computer owned_____

Offer good September 15, 1984–January 31, 1985. Limit one per family and one per product.

Scholastic

The Most Trusted Name in Learning

The Commodore Puzzle Book: BASIC Brainteasers by Gordon Lee and Nevin B. Scrimshaw (Birkhauser, 1983, $7.95, 125 pages, paperback) and *At the Heart of the Mountain: A BASIC Adventure for the Commmodore 64* (Birkhauser, 1984, $9.95, 170 pages) are two good books that emphasize using the computer to strengthen your thinking skills *and* your imagination.

The *Puzzle Book* is filled with 50 brainteasers and their answers (at the back of the book). The book gives various programming solutions to the puzzles and emphasizes that there are many different ways to write a program that solves a problem.

In *Heart of the Mountain,* you spend an adventurous summer with Erin in the White Mountains of New Hampshire and learn about the Commodore 64 along the way.

Heart and the *Puzzle Book* are for children ages 10 and up. If your children are younger, you might look into the *Micro Adventure Series* from Scholastic. The first book in the series, *Space Attack* by Eileen Buckholtz and Ruth Glick (Scholastic, 1984, $1.95, 123 pages) lets your children use their computer to decode alien messages and become a member of ACT (the Action Computer Team). On the way they enter, use, and modify eight computer programs written in BASIC.

1541 DISK DRIVE ALIGNMENT PROGRAM

Finally, a complete disk drive alignment program! **No special equipment needed!** A two disk (program and calibration) program allows anyone with average mechanical skills to properly align the 1541 disk drive. Complete instruction manual. **Don't be fooled by cheap imitations! This is the alignment program that works!**

$39.95 + $2.50 shipping (U.S.)

PROGRAM PROTECTION MANUAL FOR THE C - 64 2ND EDITION

This is the book you've been waiting for! All the latest tips and secrets. A complete reference guide to software protection on the C - 64. Covers the disk drive, bad tracks and sectors, modified directories, cartridges to disk and much, much more. A complete and up to date guide to program protection of all types. Covers both basic and machine language protection schemes. **A complete memory map** and a disk with many helpful programs is included. Over 100 pages of valuable information. **$29.95 + $2.50 shipping (U.S.)**

PROGRAM PROTECTION NEWSLETTER

A monthly newsletter covering the latest advances in program protection. Each issue will examine 3 to 5 specific programs and their protection schemes. This will be a complete **'HOW' and 'WHY'** approach to individual program protection schemes. A full explanation of each protection scheme will be included.

$35.00 per year post paid in the U.S.

C. S. M. SOFTWARE

P.O. Box 563, Crown Point, IN 46307
(219) 663-4335

VISA AND MASTER CARDS ACCEPTED
DEALER INQUIRIES INVITED

In another book, *BASIC FUN with Adventure Games* by Susan Drake Lipscomb and Margaret Ann Zuanich (Avon/ Camelot, 1984, $2.95, 96 pages), children get to go on a spy mission using their computer. Then they get to devise an adventure game of their own. The book teaches them how to construct a plot, define the solution, and determine all the obstacles and hazards that the gameplayer must face. Then it shows them how to translate their ideas into a BASIC program.

For older members of the family—teens and adults—you might want to look at *The Book of Adventure Games* by Kim Schuette (The Arrays, Inc., 1984, $19.95, 341 pages oversized). This book is a bargain if you and your family spend your computer time wandering through mazes, dungeons, and caves in adventure games. It's a reference book full of evaluations, maps, illustrations, and clues for over 75 of the most popular games. The book takes the frustration—not the challenge—out of computer adventure games.

Armchair Computer Literacy

As we all know, computer literacy is more than learning about bits and bytes. To become truly literate about computers we need to be able to step back and look at them from a distance and try to assess the impact they are having on our world.

Three books that attempt to do this take very different vantage points and, hence, complement each other nicely.

Patricia Marks Greenfield, in *Mind and Media* (Harvard University Press, 1984, $4.95, 210 pages, index, paperback) tries to assess the effects of television, video games, and computers on children. Anxious parents and teachers, concerned with their children's social and intellectual development, will find lots of fresh ideas in this book.

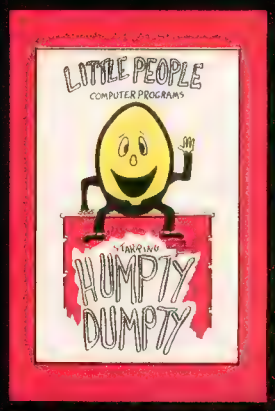
Glenn M. Kleiman, in *Brave New Schools* (Reston, 1984, $14.95, 207 pages, index, paperback) takes a close look at the computer in the classroom and at the many ways it can be used as a valuable learning tool. If you are wondering what your kids are doing with computers in school—or what they *ought* to be doing—you should read Kleiman's book.

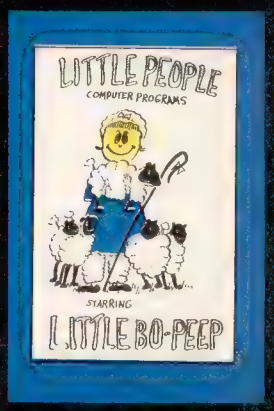
Last, Sherry Turkle, in *The Second Self: Computers and the Human Spirit* (Simon & Schuster, 1984, $17.95, 362 pages, index, hardcover), looks at the way computers affect the way we think—especially the way we think about ourselves. Turkle spent four years investigating the influence computers have on the psychology and development of preschoolers, elementary-age children, and teenagers. According to Turkle, the question is not what will the computer be like in the future, but what will *we* be like?

NEW

MY SOFTWARE TALKS ON YOUR COMMODORE 64™ AND YOU DON'T NEED A SYNTHESIZER!

NEW





Little People Software

Developed by Parents and Educators
. . . Hearing
. . . Seeing
. . . Doing
In a way that makes LEARNING more fun and more effective

Humpty Dumpty
Alphabet program by Dave Paulsen
Put Humpty together again and learn: the Alphabet, the Computer Keyboard, how to spell your Name . . . and more.

Little Bo Peep
Number program by Joe Sams and Scott Barker
Bring Bo-Peep's sheep home and learn: to Count, to spell your Name, the Computer Keyboard . . . and more.

L. P. Money I
by Aaron Grant
Teaches money values — one cent to one dollar — using a gum ball machine. Encourages money saving.

L.P. Money II
by Tom Wanne
Teaches money values — one dollar to one hundred dollars — using an ice cream machine. Encourages money saving.

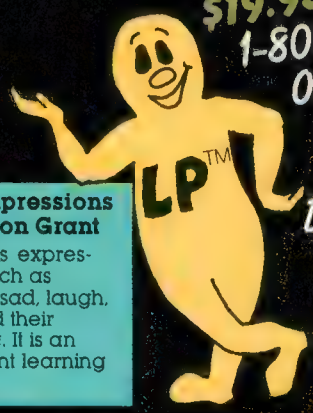
L. P. Shapes
by Doug Knapp
Learn to recognize geometric shapes and how to spell their names.

L. P. Traffic Signs
by Tom Wanne
Teaches identification and meanings of traffic signs and signals. Increases safety awareness.

L. P.'s Farm
by Aaron Grant
Teaches names and identification of farm animals.

L. P. Colors
by Aaron Grant
Teaches names and identification of colors and reinforces learning of colors and shapes.

L. P. Expressions
by Aaron Grant
Teaches expressions such as happy, sad, laugh, cry, and their spelling. It is an excellent learning tool.



$19.95 EACH — ORDER NOW!
1-800-328-2050
OR IN WASHINGTON
1-800-221-2878.
(YOU CAN PAY MORE BUT YOU CAN'T GET MORE!)

CPSI

Computer Profit Systems, Inc.
9661 Firdale Avenue
Edmonds, Washington 98020

Creators of the Money Making:
Data Deli™
Comp-u-tutor
Home Learning Systems

Mastercard and Visa

Save $2.00 per program Shipping Charge by purchasing at your local software store.

DEALER INQUIRIES INVITED

S.A.M. licensed from Don't Ask, Inc.
*Commodore 64 is a trademark of Commodore Business Machines

Budgeteer

Robert M. Pineau

This handy money manager will help you keep your checkbook and your budget balanced. For disk or tape users. Versions are included for the VIC and 64.

Did you ever wonder about the most manageable way to break down your paycheck to an assortment of categories? How much can I save this month? How much should I pay on my charge accounts? "Budgeteer" provides an easy way to help you manage your money. It will keep a record of your checkbook balance and allocate the balance among ten accounts:

1. HOUSing
2. UTILities
3. INSUrance
4. BANK (payment or savings account)
5. MC/V (bank credit cards)
6. VACAtion
7. MEDIcal
8. BOOK (subscriptions or entertainment)
9. CHGE (store charge account)
10. MISCellaneous

The total balance is kept in a separate account, CHBK.

Start With The Date

Budgeteer first asks you for the current date. Your input may be in just about any format you wish: July 4 1984; Jul. 4 1984; 7-4-84; or 7/4/84. The date format, however, must not contain commas unless the entire date is enclosed in quotes. In the INPUT statement, commas are reserved to separate variables.

After a brief pause, the program asks you to insert your data tape or disk. If you keep your data files on a separate tape or disk from programs, then there's no danger of data files overwriting your programs or vice versa. When the program continues, it will then read the account balances written during the previous session.

The very first time you run the program you'll need to establish zero balances for all the accounts, since a data file does not yet exist. When the program asks you to insert the data tape or disk, press RUN/STOP–RESTORE and add the following temporary extra program line:

```
24 GOTO 40 (VIC version)
260 GOTO 360 (64 version)
```

This causes the program to skip the read routine. This feature is also useful when the balances recorded in CHBKFILE are outdated and need to be erased. Remember to delete this line when the account is established.

Plenty Of Prompts

The program provides visual and audio prompts along the way. When you want a transaction, the choice is between making a deposit, writing a check, or transferring funds between accounts. A deposit is credited to the MISCellaneous account as well as added to the CHBK balance. When you write a check, enter the amount followed by the number of the account from which the money will come. For temporary convenience, individual account balances may be negative. Negative balances are corrected by transferring money from an account which has ample funds, usually the miscellaneous account, where deposits are credited.

The input to be made for each transaction and the required order with quantities separated by commas are:

- amount when making a deposit
- amount from account # when writing a check
- amount from account #, to account # when transferring funds.

There are built-in safeguards against some possible errors. Checks written for the wrong amount must be corrected by writing an extra check if the first was too small, or by redepositing the check amount before writing a smaller check if the first was too large. If errors cannot be readily corrected by depositing extra money, writing extra checks, or transferring between accounts, you should stop the program, type the extra GOTO line (as mentioned before), and start again with zero balances.

Inside every kid there are great adventures to be told.

With Playwriter and your computer, now you can write your own great adventure books.

Write the adventures you've always dreamed of. And turn those dreams into illustrated books, with Playwriter Software from Woodbury.

Playwriter is the first software package that lets you write, edit, illustrate, print and bind your own books using your IBM, Commodore 64, or Apple home computer.

Live the adventure as you write it

You can travel through space and time. And go where no one has gone before—to the center of your imagination. Because Playwriter helps you create the heroes, villains and other characters in your story and lets you decide every twist and turn of the plot.

Playwriter guides you through the creative process by asking you questions about the story you want to write.

Playwriter responds to everything you tell it. And you'll see your answers turn into action as the story develops.

Built-in word processor

Playwriter's simple-to-use word processor lets you go back to fix or change any part of the story you like.

Next, just print out the story and put the book together using the hardcover jacket, colorful stickers, and full page illustrations included in each package.

When you're finished, you'll have a real book including a title page, dedication page and a page all about the author, you!

Use it again

With Playwriter you can create a whole library of books written by you. Best of all, you'll have hours of fun long after the computer is shut off.

Apple, Commodore and IBM are all registered trademarks

WOODBURY
Software For Success!

No Lookin' Around

We know. You've been looking everywhere for 64 software, INSTA's *interactive* line of software is just a phone call away.

Imagine, specially designed software that "talks" to one another. Your home budget created with CALC instantly becomes a GRAPH. And your club membership list with addresses and monthly dues quickly becomes a form letter, printed over and over again, automatically, for each member.

So, no more lookin' around. INSTA is here now!

INSTA™

By Cimarron a division of MICRO SCI CORP.
2158 Hathaway Street
Santa Ana, CA. 92705
(714) 241-5600

μ-SCI MICROSCI

Commodore 64 is a trademark of Commodore

SAUCER ATTACK!

ACTUAL SCREEN PHOTOS FROM COMMODORE 1702 MONITOR.

THIS ONE IS REALLY DIFFERENT!

-UNLOCK THE POWER OF YOUR COMMODORE 64-

Dazzling high-resolution color graphics and rich sound effects enhance the action as you defend the nation's capital against an alien invasion. The pace quickens as you battle into the night, then attack the MOTHERSHIP!

$29.50 + $1.50 shipping

Order line: (714) 337-2721

SACHS ENTERPRISES
Box 1182
Lake Arrowhead, CA 92352

Name: DISK (recommended) ☐ TAPE ☐

Address: City: State ZIP:

VISA MC #: Exp.: Phone:( )

Tracking The Cash Flow

The amount of the last transaction is displayed at the top of the table of balances. An asterisk identifies the two accounts involved in the last transaction. After your final transaction, a response of N to the TRANSACTION? query will cause your updated CHBKFILE balance file to be recorded for the next session. If you are using tape, there will be a pause for you to rewind the cassette if you have not already done so. After writing the new file, you get a final display of balances and the number of transactions executed replacing the amount of the last transaction.

VIC Instructions

The VIC version has no POKEs to screen or color memory, so it will run with any or no expansion.

After running the instructions (Program 1), you have the option of repeating them if you wish. When you are finished with the instructions, the main program (Program 2) is loaded and starts running automatically. The program can be used with either tape or disk.

For the load-and-run feature to work properly, Program 2 must be saved with the filename B2. Tape users should save Program 2 immediately following Program 1 on the same tape. To modify Program 1 to work with disk, change the ,1 in line 118 to ,8. Program 2 will work with either tape or disk, depending on the value of X in line 2. If X=0, Program 2 will read and write the data file CHBKFILE on cassette; X=1 directs the program to read and write on disk.

64 Specifics

The 64 version (Program 3) operates in the same manner as the VIC version. You can select between tape and disk filing by changing the value of X in line 100 (0 for tape, 1 for disk).

See program listing on page 189.

MAKE YOUR COMMODORE 64 COME ALIVE!

with **Handy Disks**

30 great programs, a 128-page book, and a diskette for only **$19.95!**

Handy Disks represent an innovation in publishing. A fully-illustrated book that teaches programming, describes each program, and gives complete program listings and documentation. A diskette that contains over 30 great programs worth hundreds of dollars. Here's a sampling from each Handy Disk:

Beginning BASIC on the Commodore 64

• Budget • Checkbook (links to Budget) • Events Calendar • Name & Address List • Health & Fitness Tracker • Sports Statistics • Word Processor • Vacation Planner • Record Keeper • Spelling Bee • Arithmetic Drill • and many more

Creating Graphics and Music on the Commodore 64

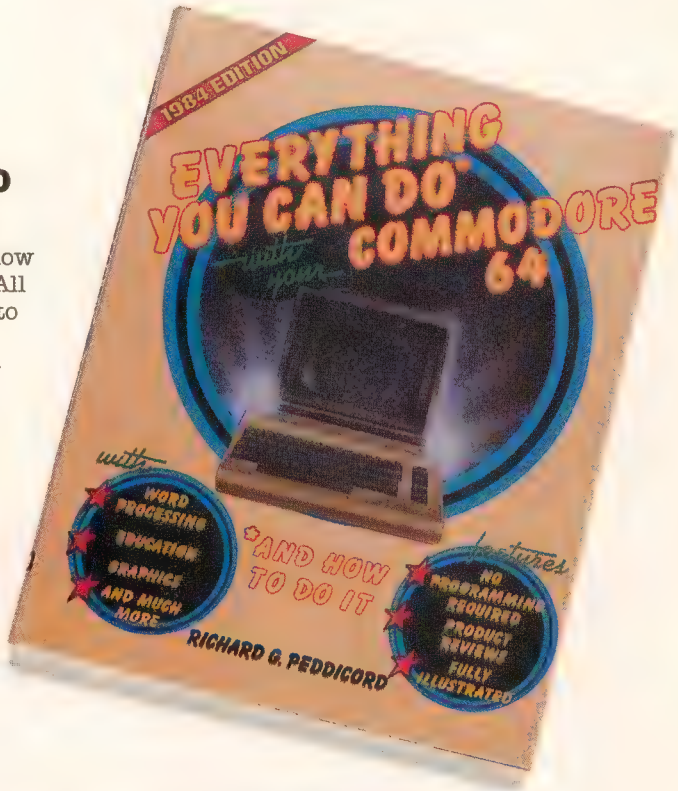
• Bar Graphs • Songwriter • 3-D Tic-Tac-Toe • Songplayer • Flag Generator • Dream Machine • 8-Channel Joystick • Automatic Bach • Tinkertoys • Synthesizer Sequencer • Sprite Writer • and many more

with **Everything You Can Do With Your Commodore 64**

Here is a 250-page book with everything you need to know to take your Commodore 64 to the limits of its potential. All the software. All the hardware. And everything you need to make them work.

Included are explanations of applications like: Communications, Education, Electronic Spreadsheets, Finance and Accounting, Games, Graphics, Record Keeping, and Word Processing. Complete descriptions and recommendations on purchasing and using specific programs like: *Doodle, Home Accountant, MusiCalc, PractiCalc, WordPro,* and dozens more. Explanations and recommendations on purchasing peripherals like graphics tablets, modems, monitors, printers, storage devices, and much, much more.

And over 150 photos and illustrations of the actual products show you *what, where,* and *how.*



Available at selected Waldenbooks and B. Dalton Booksellers and wherever Commodore books and software are sold.
Or send $21.95 ($19.95 + $2 postage & handling) for each Handy Disk or $11.95 ($9.95 + $2 postage & handling) for Everything...to:

ALFRED PUBLISHING CO., INC.
P.O. Box 5964
Sherman Oaks, CA 91413

Michael S. Tomczyk

The Four Most Important BASIC Commands

Did you ever think to yourself, "There must be some shortcuts in BASIC programming that'll let me get started sooner?" After all, young children don't have to learn the whole dictionary before they start talking. Most kids communicate quite well with just a few words. BASIC is no different. You can write some very sophisticated programs with just a few commands.

In BASIC, there are four special commands that form the basis for the entire language: PRINT, GOTO, FOR–NEXT, and INPUT. I call them the "four sizzlers" because they're the four most important BASIC commands in computing. Note that all our examples work on your Commodore 64 or VIC-20, as well as the Commodore 16 and Plus/4.

A Review Of The PRINT Command

Last month, we introduced the PRINT command, so we'll start with a very brief review of PRINT and launch right into the next three commands.

The PRINT statement has more uses than any other command. Here's a quick review of the most common uses. To try the examples, just type the PRINT command exactly as shown and press RETURN after each line to execute the command:

Note: Refer to the article "How To Type In COMPUTE!'s GAZETTE Programs" if you do not understand how to type the characters in braces ({ }).

The GOTO Command

Whenever you type RUN, your computer starts at the lowest numbered line and continues line by line to the highest. The GOTO command tells the computer to GO TO another line in the BASIC program, to break out of the usual pattern. The most common example looks something like this:

```
10 PRINT"BASIC MAGIC"
20 GOTO 10
```

This two-line program displays the same message over and over again, in a vertical column. To see how it works, type both lines as shown, then type RUN and press RETURN. To stop the program, press RUN/STOP.

If we add a semicolon (;) at the end of line 10, the messages will display horizontally instead of vertically. To make this change, type the word LIST and press RETURN, then move the cursor to the end of line 10 and type a semicolon, like this:

```
10 PRINT"BASIC MAGIC";
```

You could retype the line if you like, but with Commodore's on-screen editing you can just list

Uses Of The PRINT Command	Examples
Display messages	`PRINT"E.T. COME HOME"`
Display graphics	`PRINT"QQQQQQQQQQ"`
Display reverse characters	`PRINT"{RVS}HI{OFF} BYE"`
Calculate numbers	`PRINT(5+15)*(7-2)`
Change character colors	`PRINT"{GRN}THIS IS GREEN"`
Clear (erase) the screen	`PRINT"{CLR} NEW MESSAGE"`
Move the cursor "home"	`PRINT"{HOME}THIS IS THE HOME POSITION"`

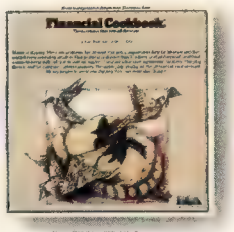
Set position on the screen (Use with cursor keys or the TAB or SPC commands)	`PRINT TAB(155)"HELLO"`
	`PRINT SPC(40)"HELLO"`
	`PRINT"{2 RIGHT} HI{2 SPACES}"`

PRINT blank rows	`PRINT"ROW1":PRINT:PRINT"ROW3"`
Calculate and PRINT variables	`X=170:PRINTX` `X=170:PRINTX+5`

(A subtle merchandising ploy)

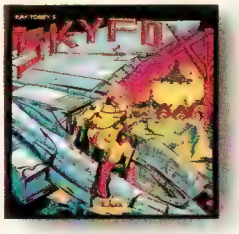
TO OUR MANY LOYAL SUPPORTERS, to new computer owners, and to everyone who still believes in the potential of personal computers to make the world a better place, we extend the following, somewhat uncharacteristic offer:

Buy 2, Get 1 Free.*



FINANCIAL COOKBOOK™
New. Powerful & versatile financial decisionmaker.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

LARRY BIRD & JULIUS ERVING GO ONE-ON-ONE™
The best-seller.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

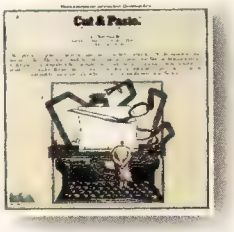


SKY FOX™
New. 3-D flight & combat simulation with 5 skill levels and 15 different scenarios.
ApII, II+, IIe & IIc

ARCHON™
Best-seller. Award-winner in Omni, Creative Computing, & Softalk.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

ARCHON II: ADEPT™
New. Graduate school for Archon addicts. More magic, new icons and battlefields.
C-64 & Atari

MUSIC CONSTRUCTION SET™
Composition for anyone who can point a joystick. Multi award-winner.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari



CUT & PASTE™
Fast, practical & easy to learn word processor. Creative Computing award-winner.
IBM-PC, PCxt, PCjr, ApIIe & IIc C-64 & Atari

REALM OF IMPOSSIBILITY™
New. Action & adventure in world of 3-D illusions. Unique 2 player cooperative mode.
C-64 & Atari

MURDER ON THE ZINDERNEUF™
A mystery novel in computer graphics. Hotline award-winner.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

PINBALL CONSTRUCTION SET™
The classic. Rolling Stone, Omni, Infoworld & Creative Computing awards.
IBM-PC, PCxt, PCjr, ApII, II+, IIe, IIc, C-64 & Atari

M.U.L.E.™
"Strategy Game of the Year" in Infoworld & Video Review for 1-4 players.
C-64 & Atari

SEVEN CITIES OF GOLD™
New. Deep, rich discovery simulation with more than 2800 screens.
ApII, II+, IIe, IIc, C-64 & Atari

ELECTRONIC ARTS™

*HOW IT WORKS: Buy any 2 EA products before Jan. 15, 1985 and send in the coupons enclosed in the packages along with your sales receipt and $3.00 to cover insured shipping. We'll send you any EA product you choose (except *Get Organized!*) for free.

Trademarks and their holders: IBM, PC, XT, and PCjr; International Business Machines, Inc Apple II, II+, IIe, IIc; Apple Computer Corp. Commodore 64; Commodore Business Machines, Inc. Atari; Atari Computer Corp. Financial Cookbook, Larry Bird and Julius Erving Go One-On-One, Sky Fox, Archon, Archon II: Adept, Music Construction Set, M.U.L.E., Seven Cities of Gold, Cut & Paste, Realm of Impossibility, Murder on the Zinderneuf, Electronic Arts, Inc.

the line, make the change, and press RETURN. Line 20 stays the same. Now, cursor down to a blank area of the screen (past line 20) and type RUN and press RETURN. Oops—the message is moving a little too fast. How do we slow it down? We'll use our next command, the FOR–NEXT loop.

The FOR–NEXT loop is a two-part command which lets you do two things: create time delays and repeat actions. A time delay slows down any activity in a program—for example, when you want to print a message and leave it on the screen for a few seconds. Repeating actions is the second major function of the FOR–NEXT loop, but first let's see how the time delay works.

A FOR–NEXT delay loop tells the computer to stop where it is and count to some number (one that you choose) before going on to the next part of your program. You can insert this line almost anywhere when you want to slow things down. Here's what it looks like:

```
FOR T=1 TO 500:NEXT
```

The key number here is 500, because that's how far the computer counts before going on. If you make this number smaller, the delay is shorter and the program moves faster. If you make it higher, the delay is longer and the program moves more slowly. The variable T can be any other letter of the alphabet (we'll use T here to stand for Time). The word NEXT tells the computer to go on to the next number.

Let's slow down the GOTO example we just typed in the previous program. We'll do this by adding a FOR–NEXT loop just after the PRINT message. This will make the computer display the message, then count to 500 before going on. Enter the line shown below. (First, type LIST and press RETURN to see our original program.) To see what it does, type RUN and press RETURN:

```
15 FOR T=1 TO 500:NEXT
```

Presto! The program runs slower. To see how different numbers change the speed, LIST your program and change the 500 in line 15 to a larger or smaller number.

Two Flashing Messages

Here's another example. Type NEW and press RETURN, then enter this program:

```
10 PRINT"{CLR} WELCOME TO"
20 PRINT"{CLR} BASIC MAGIC"
30 GOTO 10
```

After entering, cursor down past line 30 and type RUN.

Too fast, right? To slow down this program, we need *two* delay loops—one after each message. First, press RUN/STOP, then type LIST. Now enter these two lines:

```
15 FOR T=1 TO 700:NEXT
25 FOR T=1 TO 700:NEXT
```

Here's a timesaving tip: Since the lines are identical (except for the line number), you can type all of line 15, press RETURN, and then cursor up and change the 15 to a 25, and press RETURN.

Now LIST your program again. Notice that the computer has automatically inserted line 15 between lines 10 and 20, and line 25 between lines 20 and 30. Your new program should look like this:

```
10 PRINT"{CLR} WELCOME TO"
15 FOR T=1 TO 700:NEXT
20 PRINT"{CLR} BASIC MAGIC"
25 FOR T=1 TO 700:NEXT
30 GOTO 10
```

Type RUN and press RETURN to see a new and slower program. You can use this little program to flash a message or title at the top of the screen. But what if you wanted to flash the message just a certain number of times—eight times, for instance?

Using FOR–NEXT To Repeat Actions

The most important use of the FOR–NEXT loop is to repeat actions in your program. To repeat an action, simply put the FOR part of the loop at the *beginning* of the action, and put the word NEXT at the *end* of the action, like this:

```
FOR X=1 TO 8:(THE ACTION YOU WANT TO REPE
  AT):NEXT
```

The computer will repeat everything between the FOR part of the command and the word NEXT. The numbers 1–8 mean the action will be repeated 8 times. (The computer is counting again, just like in our time loops.) Of course, you can use any number in place of the 8, depending on how often you want to repeat the action. The variable X, like the variable T in our previous example, can be any letter of the alphabet. If you use more than one repeat-action loop in a program, you should use different variable letters for each loop.

To make our blinking message flash eight times, we put the first part of the loop in front of the actions we want to repeat, and the word NEXT at the end. Note that we don't need the GOTO command here because we don't have to "go back" to repeat the action. The FOR–NEXT loop *surrounds* the action and makes it repeat. To see how this works, let's edit our previous program by adding line 5 and retyping line 30. The new program looks like this:

```
5 FOR X=1 TO 8
10 PRINT"{CLR} WELCOME TO"
15 FOR T=1 TO 700:NEXT
```

[OH NO, NOT AGAIN.]

SON *of* ARCHON.

Jon Freeman, Paul Reiche III and Anne Westfall created Archon, the 1983 "Game of the Year" according to Softline and Creative Computing. Recent evidence, however, indicates they were not satisfied with this

If you took all the hours spent by all the people who've played Archon and put them together, there's a good chance it'd amount to more human effort than it took to put a man on the moon.

The Archon Dragon

What does this mean? Is it a good thing? And why, in light of this, did the people pictured here decide to issue a scorching sequel named *Archon II: ADEPT?*

For starters, we don't really know what it means. Except that a lot of people who had a pretty good time with *Archon* are about to get more of what they like. And people who've yet to experience the best-selling, award-winning, knuckle-whitening original have *two* good things coming their way.

The Archon Basilisk.

Point two: If there's a moral issue here, we see it this way: A wise man once said, "I ain't never had too much fun." We agree. And we think that once you get your hands on *Archon II: ADEPT*, you'll see his point.

Now for the third question. Why a sequel? Well, there are sequels and there are sequels. The good ones happen because people just haven't had enough of a good thing. Obviously we're here to tell you that *Archon II: ADEPT* falls into the right category.

The ADEPT Chimera

Where Archon took inspiration from chess, fantasy role-playing characters and arcade combat, *ADEPT* comes more from a world of its own making. Like *Archon*, it pits the forces of good against those of evil. But in place of the chessboard motif there is a map of elements—Earth, Air, Fire and Water. The role of magic is greater. The strategies are deeper. Things move faster. And the hidden algorithms that control the computer's play are considerably smarter.

The ADEPT Thunderbird

Having already spent the better part of a month playing *ADEPT* (in order to write this ad, of course), we're quite confident it will seduce you too.

And if, by some strange chance, there is a parallel universe in which computer simulations come to life, we are confident that a large part of its population has Jon Freeman, Paul Reiche III and Anne Westfall to thank for their brief and miserable existence.

ARCHON™ & ADEPT™

from ELECTRONIC ARTS.™

MACHINE REQUIREMENTS: *Archon* is available on the Apple II, II+, IIe & IIc, IBM-PC, PCXT & PCjr, Commodore 64 and Atari. *Archon II: ADEPT* is available on the Commodore 64 and Atari

Archon and *Archon II: ADEPT* are registered trademarks of Electronic Arts, Inc. Atari is a trademark of Atari Computer Corp. Apple is a trademark of Apple Computer Corp. Commodore is a trademark of Commodore Business Machines, Inc. IBM is a trademark of International Business Machines, Inc. For a free product catalogue, send a stamped self-addressed #10 envelope to Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403

```
20 PRINT"{CLR} BASIC MAGIC"
25 FOR T=1 TO 700:NEXT
30 NEXT
```

Type RUN, press RETURN, and the message will blink eight times. Notice that we have both PRINT statements *and* time delay loops between the FOR and the NEXT in our repeat-action loop. Yes, you can put loops inside of loops. Anything you put between the FOR and NEXT will be repeated: a sound effect, a graphics symbol, or a programming action. Loops can be tricky, though. Just remember that your loop has to completely surround the action(s) you want to repeat.

You can also use the FOR–NEXT command to repeat a graphics symbol to make a border, a design, or to draw a line, like this:

```
FOR X=1 TO 22:PRINT"C";:NEXT
```

In this line, the action between the FOR and the NEXT is repeated 22 times—in other words, the horizontal line graphics symbol is printed 22 times. Let's see how we could use this in a BASIC program. Type NEW and press RETURN, then enter this short program, which demonstrates how to make a title with a line under it:

```
10 PRINT"{CLR}BASIC MAGIC:4 COMMANDS"
20 FOR X=1 TO 22:PRINT"C";:NEXT
```

If you have a 40-column computer (such as the Commodore 64) and you want the line to go all the way across the screen, change the 22 to a 40. And if you're wondering why we put the semicolon in line 20, that's so the graphics line characters all print next to each other across the screen. If you remove the semicolon, you'll get 22 short lines running down the screen.

A Flashing Title

Now that we know how to slow down our BASIC programs, and how to repeat actions using the FOR–NEXT loop, let's try something a little fancier. First, we'll see how to make a long message appear on the screen and keep repeating using the GOTO command. Then we'll see how to make the message repeat five times and stop. Type NEW and press RETURN to erase the last program and type in this program exactly as shown:

```
10 PRINT"{CLR}"
20 PRINTTAB(92)"BASIC MAGIC"
30 FOR T=1 TO 700:NEXT
40 PRINTTAB(92)"TEACHES YOU"
50 FOR T=1 TO 700:NEXT
60 PRINTTAB(92)"EASY COMPUTING"
70 FOR T=1 TO 700:NEXT
80 PRINT"{CLR}":FOR T=1 TO 700:NEXT
90 GOTO 20
```

Type RUN and press RETURN. Now let's take a look at how this program works, line by line.

Line 10 prints the CLEAR character, which clears the screen.

Line 20 introduces the TAB command, which is used to position information on the screen. PRINT TAB(92) "BASIC MAGIC" tells the computer to "tab" over 92 spaces from the top lefthand corner of the screen, then print the message. Notice that the tab portion of the line is outside the quotation marks but is still a part of the PRINT statement.

Line 30 is a time delay loop that leaves the first message (BASIC MAGIC) on the screen while the computer counts to 700 before continuing.

Line 40 moves one line below the BASIC MAGIC line, then tabs over 92 spaces from the left edge of the screen, and prints the next message (TEACHES YOU).

Line 50 is another time delay loop, identical to line 30, that makes the computer wait a few seconds before moving on to print the next message.

Line 60 is another TAB and PRINT combination which positions and displays the final portion of our message (EASY COMPUTING).

Line 70 is another time delay loop, again, identical to line 30.

Line 80 is interesting. It clears the screen, then uses a time delay loop to leave the screen blank for a count of 700. Notice that you have to use a colon (:) to separate commands when you use more than one on the same program line like we did here.

Line 90 is our old friend the GOTO command. This tells the computer to go back to line 20 and print the messages all over again. Notice we don't have to GOTO line 10 and clear the screen because we already took care of that in line 80: We can go directly to line 20.

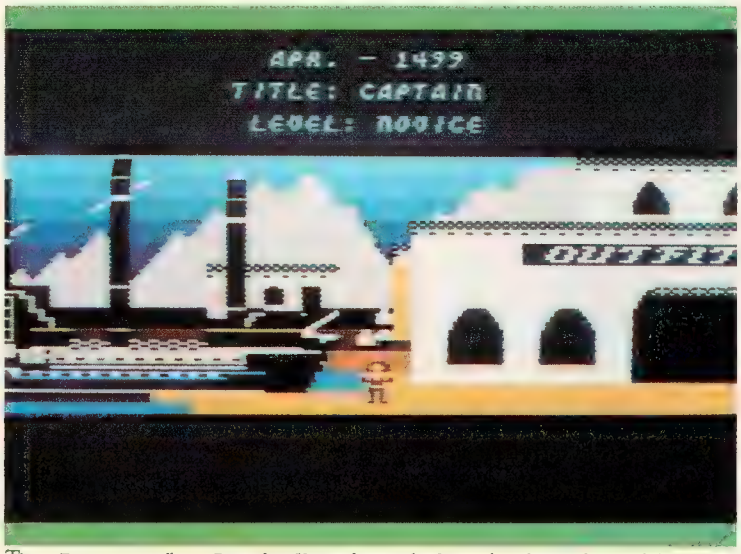
There's only one thing wrong with this program. The GOTO command traps you in an endless loop. It keeps going and going and going. What if you want to go on to something else in your program?

If we use the FOR–NEXT command to repeat the title five times, the computer will automatically go on to the next part of the program after the title is displayed the fifth time. To change our title program, we just have to include a new line 5, retype line 90, and add line 95. Here's how the modified program should look:

```
5 FOR X=1 TO 5
10 PRINT"{CLR}"
20 PRINTTAB(92)"BASIC MAGIC"
30 FOR T=1 TO 700:NEXT
40 PRINTTAB(92)"TEACHES YOU"
50 FOR T=1 TO 700:NEXT
60 PRINTTAB(92)"EASY COMPUTING"
70 FOR T=1 TO 700:NEXT
80 PRINT"{CLR}":FOR T=1 TO 700:NEXT
```

[*"Hi, we're from Europe. Where's the gold?"*]

A SECOND CHANCE *to* GET *the* NEW WORLD RIGHT.



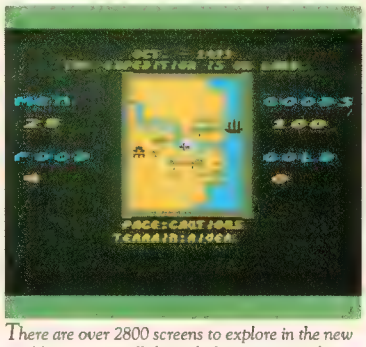
This is Europe, in scrolling 3-D graphics. You outfit, visit the Crown, launch your ships, and if you're cut out for this, you return later to tell all sorts of wild stories about what it's like over there.

IF COLUMBUS HAD LANDED IN NEW JERSEY; if Cortez had been nicer to Montezuma; if Pizarro had been a more generous soul, would the world today be any different?

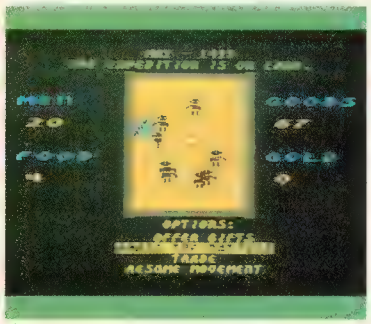
If you've ever wondered about things like that, you'll like *Seven Cities of Gold* very much indeed.

It's a kind of adventure. An unusually rich and technically impressive one with new continents to explore, natives to encounter, resources to manage and trade routes to establish. But beyond all the neat stuff *Seven Cities* throws up on the screen, there's something else happening here.

It feels quite odd to look at the map and see nothing. Of course you have to explore the more than 2800 screen new world in order to map it. But the way the natives act, the way you get older, the way seasons change and your men behave, and the way your reputation preceeds you gives you a sort of feeling that's unexpected in computer games. It's deeper. Maybe a little disquieting. It plays as much in your head as it does inside your computer.



There are over 2800 screens to explore in the new world. As you scroll through them, seasons change.



Animated natives surround you. They have no reason to trust you. The drum beat quickens.

Trading with the Aztecs is tricky. You could wind up with enough gold to build an empire. Or as soup.

Home again you view your maps, pat yourself on the back, and consider your place in history.

Seven Cities does all this with the real world or, better still (since the "new" world really isn't anymore), it will construct any number of completely detailed hemispheres for you to try your hand with.

Designed by Ozark Softscape (the people who made M.U.L.E., *Infoworld's* "Strategy Game of 1983"), *Seven Cities* is about as near a recreation of history as has ever been accomplished, with or without a computer.

Find it. Stomp around in it. See if you can't do a better job than all the celebrated figures who got us into the mess we have to deal with today.

SEVEN CITIES *of* GOLD™

from ELECTRONIC ARTS.™

MACHINE REQUIREMENTS: *Seven Cities of Gold* is available for the Apple II, II+, IIe & IIc, Commodore 64 and Atari home computers.

Seven Cities of Gold and M.U.L.E. are registered trademarks of Electronic Arts. Apple is a trademark of Apple Computer Corp. Commodore is a trademark of Commodore Business Machines, Inc. Atari is a trademark of Atari Computer Corp. For a free product catalogue, send a stamped, self-addressed #10 envelope to Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403

```
90 NEXT
95 PRINT"{CLR} THE REST OF YOUR PROGRAM G
   OES HERE"
```

Try experimenting with your own messages, or print some graphics designs instead of words. You might also want to experiment with the TAB command to position your messages in different places on the screen.

REM: *The TAB command is used with the PRINT statement to position information on the screen or on your printer. You can tab from 1 to 255 spaces, but if you want to tab farther than that, you'll need to combine two TAB commands next to each other like this:*

```
PRINTTAB(255)TAB(20)"HELLO"
```

The SPACE command, abbreviated SPC, works the same way except instead of tabbing over to a column position, the computer inserts the number of spaces shown in parentheses:

```
PRINTSPC(20)"20 SPACES"
```

Many programmers use the TAB and SPC commands as a shortcut to position characters on the screen. It's a lot easier and faster than trying to print a number of cursor-right and cursor-down commands, which is the other method of positioning.

A Peek At Variables

Variables are shortcut alphabetic codes which are used in BASIC programs to stand for numbers, words, or graphics characters. There are two types: numeric variables and string variables.

Numeric variables are used to represent numbers. The number can be a fraction (.5), a large number (99,589,870), or even a negative number (−15). The name of the variable can be a single letter, such as A, B, C, D; two letters, such as AB, QR, ZZ; or a letter and a number, such as H5, H6, J1. Note that the first character of a variable is always a letter from A–Z and the second has to be a letter or a number. You can use longer variable names if you like, but your computer looks only at the first two characters. So if you use one variable called HIGH and another called HIT, your computer will think they are the same (HI).

String variables represent words, letters, sentences, and graphics characters. Their names are similar to numeric variables (the first character is a letter, the second is a letter or number), but they are always followed by a dollar sign ($). Here are a few examples: A$, B$, C$, PQ$, HH$, F1$, F2$, G9$. String variables are easy to remember because the dollar sign looks like the letter S for "string."

There is also a special kind of numeric variable called an integer variable (A%, for example) which is limited to whole numbers. But we won't deal with that quite yet.

In BASIC programming, variables are substituted for words, phrases, and numbers because they are a faster, easier way to work with information. They're especially good in calculations and in the INPUT statements we'll see in a moment.

When you type RUN, all the variables are emptied out. Numeric variables are set to equal zero and string variables are set to a null (nothing) string. FOR–NEXT loops can put values into variables (as we've seen above). Or you can assign a value using the LET command. If you tell the computer LET A=5, you're saying from now on you want the variable A to hold the value 5. But LET is optional as you see here:

`A=192:PRINT A`	(PRINTA is the same as PRINT192)
`A=2:B=3:PRINT A+B`	(PRINTA+B is the same as PRINT2+3)
`R=1:PRINT R:R=R+1:PRINT R`	(R=R+1 is the same as R=1+1)
`C$="MESSAGE":PRINT C$`	(PRINTC$ is the same as PRINT"MESSAGE")

The INPUT Command

The INPUT command can make your computer seem like it's intelligent. This command lets the computer ask questions and then respond to the answers you type in from the keyboard.

Here's an idea for a program to show how the INPUT command works:

1. Clear the screen
2. Print a prompt message (a question or instruction)
3. Type the INPUT command with a numeric or string variable
4. Process the information that was INPUT

Let's take a look at a short program that uses this format. Type NEW and press RETURN, then enter this program:

```
10 PRINT"{CLR}"
20 PRINT"PLEASE TYPE YOUR NAME AND PRESS
   {SPACE}RETURN"
30 INPUT N$
40 PRINT"{CLR} HELLO, "N$"...HOW ARE YOU?
   "
50 FOR T=1 TO 1500:NEXT
60 FOR X=1 TO 100:PRINTN$" IS A NICE NAME
   !":NEXT
```

Type RUN and press RETURN. Follow the instructions on the screen and you'll see that you've just taught your computer to recognize your name. Here's a line-by-line explanation of how the program works:

Line 10 clears the screen.

Line 20 prints a message, asking the user to type his or her name.

Line 30 contains the INPUT command, which makes the computer automatically display a question mark (also called a prompt) and wait

A STEP BEYOND.

QUICKSILVA

All Titles available from:

QUICKSILVA INC. 426 West Nakoma San Antonio Texas 78216. (512) 340 3684.

ANT ATTACK

THE SNOWMAN

BOOGABOO

FRED

PURPLE TURTLES

COMING SHORTLY!
Programs for ACORN, ATARI, MEMOTECH MTX, SINCLAIR QL and MSX SYSTEM

Available on Disc for the COMMODORE 64™. Send for details of our full range of Commodore programs.

until you type your name. When you type your name and press RETURN, the computer assigns your name to the variable N$. From now on, any time the variable N$ appears in this program, it's the same as using your name.

Line 40 clears the screen and prints a message containing your name. The word "HELLO" is printed *inside* quotation marks, then the variable N$ (which is already defined as your name) is *outside* quotation marks, and the rest of the message "...HOW ARE YOU?" is *inside* quotation marks. This is a little clumsy, but it's necessary because words are always printed inside quotation marks and variables are always used outside quotation marks.

Line 50 is a time delay loop which leaves the HOW ARE YOU message on the screen for a count of 1500.

Line 60 is a repeat-action loop, which prints another message, using your name, 100 times. Again, the N$ variable (your name) is outside quotation marks and the message itself is inside quotes.

The Magic Adding Machine

Let's try another example. This time we'll use numbers. We'll call this the "magic adding machine" because it lets you enter two numbers, then automatically gives you the answer. Because this example uses numbers instead of words, the INPUT variables will be *numeric variables* (no dollar sign) instead of string variables.

```
10 PRINT"{CLR}MAGIC ADDING MACHINE"
20 FOR X=1 TO 20:PRINT"D";:NEXT
25 FOR T=1 TO 1500:NEXT
30 PRINT"{CLR}ENTER TWO NUMBERS AND PRESS
   RETURN AFTER EACH NUMBER"
40 INPUT A
50 INPUT B
60 PRINT A"PLUS"B"EQUALS"A+B
```

Type RUN and press RETURN, then type in two numbers as requested and watch the magic adding machine work. By changing line 60 slightly, this can also be a magic multiplication, subtraction or division machine. Here's how it works:

Line 10 clears the screen and prints the opening title.

Line 20 is a repeat-action loop that draws a 20-column line across the screen under the title. Again, the semicolon makes the lines print across the screen (instead of vertically).

Line 25 is a time-delay loop that leaves the title on the screen a few seconds.

Line 30 clears the screen again and prints the prompt message, which tells you what to do—in this case, enter two numbers and press RETURN after each entry. (Prompt messages are very important. Don't assume that users will know they're supposed to press RETURN after typing.)

Line 40 is the INPUT for the first number, which we'll call A. A is a numeric variable and from now on A stands for the first number typed in by the user.

Line 50 is the INPUT for the second number, which we'll call B. B now stands for that number.

Line 60 uses the two numbers (A and B) in a PRINT statement. First, the variable A is printed, followed by the word "PLUS". Then the variable B is printed, followed by the word "EQUALS". Next, a calculation is printed (A+B) and the computer displays the answer. All of this information is included in the same PRINT statement, but the variables A and B and the calculation A+B are printed *outside* quotation marks.

Remember: Numbers, numeric variables and calculations are always printed outside the quotation marks, so if you want to mix words and numbers or calculations as we did in this example, you'll have to pop in and out of quotation marks.

If you want to try a different type of calculation, such as a Magic Multiply Machine, you'd change the title in line 10, and change line 60 to:

```
60 PRINT A"TIMES"B"EQUALS"A*B
```

The asterisk (*) is used to multiply in BASIC because the normal multiplication sign (×) is too easily confused with the letter X and the X-shaped graphics symbol.

The Magic Nonsense Story

Our last example is a silly little nonsense story. You make your own story by filling in the words and numbers. You can probably think of some longer examples to try, but here's a short program to get you started:

```
10 PRINT"{CLR}TYPE A NUMBER 1 TO 12 AND P
   RESS RETURN":INPUT N
20 PRINT"{CLR}ENTER A NOUN AND PRESS RETU
   RN":INPUT N$
30 PRINT"{CLR}ENTER A VERB AND PRESS RETU
   RN":INPUT V$
40 PRINT"{CLR}ENTER AN ADJECTIVE AND PRES
   S RETURN":INPUT A$
50 PRINT"{CLR}IT WAS"N"O'CLOCK AND THE "A
   $" "N$" WAS "V$"ING ALL OVER THE PLACE
   !"
```

Type RUN and press RETURN, then answer the questions and read the one-line "story."

The only tricky part in typing in the program is inserting spaces in the right places so the sentence looks right when it's printed. Note the spaces in line 50. They're important because they make the sentence read correctly.

Until next month, practice with these commands and techniques. You'll find there's a lot you can do with these four important BASIC commands.

Christmas Carols for the 64

Sing Along With Your Favorite Songs

Here's a great way for you and your family to have fun with your Commodore 64™ this Christmas. Our exciting new Christmas Carols disk features 18 of your favorite holiday songs; each professionally arranged for the 64 with entertaining graphics. For sing along fun, the lyrics appear in easy-to-read verse on your TV or monitor. Play just your favorite song or set your Commodore to play them all. It's a great way to show off your computer. As always, you can trust John Henry Software to bring you quality software at the lowest price. We specialize in prompt delivery and guarantee our product. Don't wait, order your Christmas Carols today!

SONGS INCLUDE:

Angels We Have Heard on High • Away in a Manger • O Come All Ye Faithful • Deck the Halls • The First Noel • God Rest Ye Merry Gentlemen • Hark the Herald Angels Sing • O Holy Night • It Came Upon a Midnight Clear • Jingle Bells • Joy to the World • Jolly Old St. Nicholas • O Christmas Tree • Silent Night • O Little Town of Bethlehem • We Three Kings of Orient Are • What Child is This • Up on the Housetop

An Actual Screen

ALL FOR ONLY

$15.95

Send check or money order for $15.95, U.S. funds, plus $1.00 for postage and handling. Or use your Visa or MasterCard (include your account number and expiration date). Foreign orders, add $3.00 for Air Mail delivery.

For more information write us at:
P.O. Box 39021, Cincinnati, Ohio 45239
U.S. orders received by December 15, are guaranteed for Christmas delivery.

Commodore 64 is a registered trademark of Commodore Electronics Limited.

Please send me _____ Christmas Carols disk(s) at $15.95 each plus $1.00 postage and handling. Ohio residents add 88¢ sales tax.
☐ Check or money order enclosed ☐ Visa ☐ MasterCard

Account# _____ Exp. Date _____

Name _____

Address _____

City _____ State _____ Zip _____

Send to John Henry Software, P.O. Box 39021, Cincinnati, Ohio 45239.
Foreign orders please pay in U.S. funds and add $3.00 for Air Mail delivery.

John Henry Software®
QUALITY IS OUR STRENGTH

User Group Update

When writing to a user group for information, please remember to include a self-addressed, stamped envelope. Send additions, corrections, and deletions for this list to:

COMPUTE! Publications
P.O. Box 5406
Greensboro, NC 27403
attn: Commodore User Groups

Changes

The Honeywell Commodore Users Club has a new president and address. The club can be reached care of Art Witbeck, Honeywell Inc., Marine Systems Division, 5303 Shilshole Ave. NW, Seattle, WA 98107.

The Corpus Christi Commodores have a new phone number, (512) 852-4426. Bob McKelvy is the contact person.

University VIC-Commodore User Support System also has a new contact person, D. Wade, who can be reached at (216) 673-9261.

Correspondence for Computer Operators (C.O.M.P.) should be sent to Brian Pringle, president, at 7514 Puttgutt Road, Richmond, MI 48062. The phone number is (313) 329-2625.

The Silver State Commodore Users Group has a new address: P.O. Box 81075, Las Vegas, NV 89180.

The phone number for the WICOMICO C64 Club is (301) 749-3573.

Southern Maine 64 Users Group has a new address: Edward Moore, 9 Lynda Road, Portland, ME 04103.

Ark-La-Tex Commodore 64 Club has a new president and address. Correspondence should be sent in care of Bill Walker, 5515 Fairfax, Shreveport, LA 71108. The phone number is (318) 636-3611.

The National Science Clubs of America/ Commodore User Division is no longer in existence.

The new address and contact person for 64-B.U.G. (Boise User's Group), is Cheryl Ohnsman, 403 Thatcher St., Boise, ID 83702.

The Calgary Commodore Users Group has a new president and mailing address: Lloyd E. Norman, 810 Canfield Way SW, Calgary, Alberta, T2W 1K1, Canada.

The Commodore VIC-20 user group of Malden, MA, is now the Commodore Users Group of the Boston Area (CUGOBA). The Commodore 64 has been added as an area of interest. The club can be contacted through Patrick Rooney, 63 Whitman St., Malden, MA 02148.

The new address for the Bay Commodore Users' Group is P.O. Box 3187, Panama City, FL 32401.

The Fire 10 VIC User Group of Portland, OR, has reorganized and is no longer in existence. A new club in Portland is Rose City C-64 Club, Gary Getch, 5830 SW Kelly, Portland, OR 97201.

New Listings

ARKANSAS

River City Commodore Club
Gary Smith
P.O. Box 4298
North Little Rock, AR 72116

CALIFORNIA

Commodore Owners of Petaluma (COOP)
Dave Stroud
877 Grant St.
Petaluma, CA 94952
(707) 762-8398

VISIONS-64
David Lee
P.O. Box 26638
San Francisco, CA 94126

Stockton Commodore User's Group
Rita McCann
2929 Calariva Drive
Stockton, CA 95204
(209) 948-5890

CONNECTICUT

N.C.C.U.G.
Steve Stepleman
P.O. Box 2116
Norwalk, CT 06851

DELAWARE

Lower Delaware Commodore Computer Club
Paul Nys
110 Strawberry Way
Rehoboth Beach, DE 11971

FLORIDA

Gainesville Commodore Users Group
Mike Timpe
P.O. Box 14716
Gainesville, FL 32604

Gainesville Commodore Users Group
Drew Hurley
Santa Fe Community College
P.O. Drawer 1530
Gainesville, FL 32602

South Tampa Commodore Users Group
Ronald S. Clement
736 F Secord Drive
MacDill AFB, FL 33621

Fort Walton Beach Commodore Users Group
Jim Moore
P.O. Box 3
Shalimar, FL 32579
(904) 651-3737

ILLINOIS

Survivors of Sixty-Four Users' Group (SOSUG)
Macey B. McKee
WESL Institute
Western Illinois University
Macomb, IL 61455
(309) 298-2106; (309) 837-5378

Springfield Area VIC Enthusiasts (S.A.V.E.)
Mike Stout
P.O. Box 2961
Springfield, IL 62708
(217) 522-2706

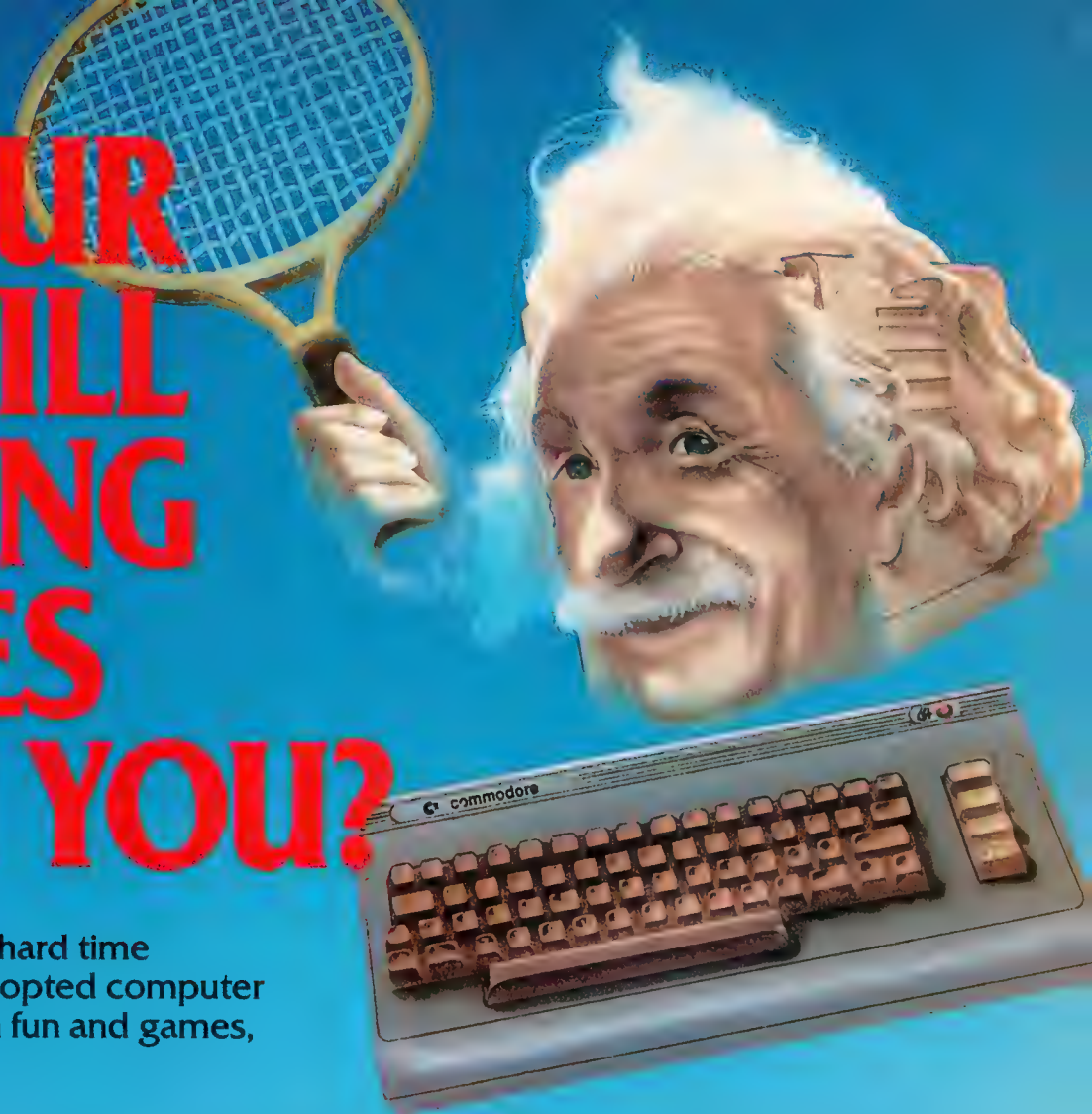
INDIANA

Tri-State Commodore Users
Jerry Schauss
6500 Center Ridge Road
Newburgh, IN 47630
(812) 853-2334

LOUISIANA

Commodore Pet User Group (C-PUG)
Stan Pape
616 N. Niagra Circle
Gretna, LA 70053
(504) 394-4928

IS YOUR 64 STILL PLAYING GAMES WITH YOU?



If you've been having a hard time teaching your newly-adopted computer there's more to life than fun and games, you're not alone.

Now, you can introduce your Commodore 64™ to the Work Force: affordable, easy-to-use software and hardware that will unleash the power you always expected from your Commodore 64™, but thought you might never see.

PaperClip™

is simply the best word processing program of its kind—loaded with advanced features, yet so easy to use even a novice can get professional results. With **SpellPack**™, it even corrects your spelling! Once you've tried it, you'll never use a typewriter again.

The Consultant™

(formerly Delphi's Oracle)

is like a computerized filing cabinet with a brain. Organize files for recipes, albums, or the membership of your service club. Then search, sort, arrange and analyze your information with speed and flexibility that's simply astounding.

SpellPack™

teaches your 64 to spell. It checks an entire document in 2 to 4 minutes against a dictionary of over 20,000 words. And you can add up to 5,000 of your own specialized terms. Type letter perfect every time!

BusCard II™

is a magic box that lets you transform your humble home computer into a powerful business machine. It gives you the added power of BASIC 4.0, and lets you add IEEE disk drives, hard disk, virtually any parallel printer, and other peripherals without extra interfaces. Completely software invisible.

B.I.-80™ *Column Adaptor*

gives you crystal clear 80 column display. Using the highest quality hardware, we've eliminated the problems of snow, fuzziness and interference. Basic 4.0 commands greatly simplify disk drive access. Switches easily from 40 to 80 column display.

Discover the true power of your Commodore 64™. Ask your dealer about the Commodore 64™ Work Force, from Batteries Included—the company that doesn't leave anything out when it comes to making things simple for you.

BATTERIES INCLUDED

"Excellence in Software"

These products have been developed specifically for Commodore computers by Batteries Included and are totally compatible with each other. For a full color brochure write to:

186 Queen Street West, Toronto, Canada M5V 1Z1 (416) 596-1405 / 3303 Harbor Blvd., Costa Mesa, CA. 92626 (714) 979-0920

64 AND COMMODORE 64 ARE REGISTERED TRADE MARKS OF COMMODORE BUSINESS MACHINES

MICHIGAN

Commodore Computer Club of Monroe
Bob Trimble
P.O. Box 586
Monroe, MI 48161
(313) 269-2291

Edwardsburg Commodore Users' Group (E.C.U.G.)
Doug Stringfellow
406 Brush Road
Niles, MI 49120
(616) 663-2792

Tecumseh Commodore Users Group (T-CUG)
Todd Miller
3285 Gove Drive
Tecumseh, MI 49286
(313) 423-5681

MINNESOTA

Club 64
Stephen Knudsen
256 16th St. NE
Owatonna, MN 55060
(507) 451-0128

MISSOURI

Commodore Users Group of Springfield (CUGOS)
Keith J. Masavage
Box 607 Jewell Station
Springfield, MO 65801
(417) 831-6403

NEBRASKA

Pathfinders 64
Kent Tegels
1812 North I Street
Fremont, NE 68025

NEVADA

S.O.G. Commodore User Group
Dave Goeking
IC Electronics
4011 W. Charleston Blvd.
Las Vegas, NV 89102
(702) 870-4201

NEW HAMPSHIRE

Monadnock Commodore 64 Users
Paul F. Rule III
RFD No. 1, Route 10
Winchester, NH 03470
(603) 352-6722

NEW JERSEY

The Smart One Commodore 64 Users Group
John Cappuccilli
6005 Washington Street
West New York, NJ 07093

NEW MEXICO

The Southern New Mexico Commodore User's Group
David Selwyn
P.O. Box 4437
University Park Branch
Las Cruces, NM 88001
(505) 522-7622

NEW YORK

Finger Lakes Area Komputer Experts (F.L.A.K.E.S.)
Terri Lynne Narby
86 West Lake Road
Hammondsport, NY 14840
(607) 868-3674

MI-64
Alex Migliozzi
4 Essex Place
Jericho, NY 11753
(516) 681-2391

Rockland County CPU (Commodore 64 Professional Users) Group
Brian Telesh
98 West Central Avenue
Spring Valley, NY 10977

The Commodore Computer Users Group of Syracuse
Kevin DeNardo
P.O. Box 2232
Syracuse, NY 13220
(315) 457-1725

Chautauqua County Commodore User Group
Mark Dunlap
Sector One Computer, Inc.
19–21 East Main Street
Westfield, NY 14787
(716) 326-2222

NORTH DAKOTA

Central Dakota Commodore Club
Bob Macleod
102 Capitol Avenue
Bismarck, ND 58501
(701) 223-3390

OKLAHOMA

Commodore Users of Bartlesville
Fred Mayes
1704 S. Osage
Bartlesville, OK 74003
(918) 336-0233

Commodore Users Group
Muskogee Computer Society
Steve Ford
202 S. 12th Street
Muskogee, OK 74401

PENNSYLVANIA

World Wide Commodore User Groups
Dave Walter or Richard Franklin
110 Miami Avenue
Norristown, PA 19403
(215) 584-4483

World Wide Commodore User Groups
Dave Walter or Richard Franklin
R.D. No. 1
Washington Road
Bechtelsville, PA 19505
(215) 584-4483

World Wide Commodore User Groups
Dave Walter or Richard Franklin
1004 Kinglet Drive
Norristown, PA 19403
(215) 584-4483

West Branch Commodore Users Group
Gene Loveland
P.O. Box 995
Williamsport, PA 17703
(717) 323-7901

SOUTH CAROLINA

Commodore User Society
Bo Jeanes
c/o Horizon Records
347 Pleasantburg
Greenville, SC 29607
(803) 235-7922

TEXAS

Longview Users Group
P.O. Box 2504
Longview, TX 75606
(214) 759-3459, (214) 777-4458, or (214) 759-0699

Meadows User Group (MUG)
David Whittington
11923 Scottsdale
Meadows, TX 77477

Temple Commodore Users Group
Karen Dodson
P.O. Box 1173
Temple, TX 76501

Crossroads Commodore Users' Group
Jerry Guy
417 Irma Drive
Victoria, TX 77901
(512) 575-0342

VIRGINIA

Commodore Users of Franklin
George Perry
104 Millstone Circle
Courtland, VA 23837
(804) 562-4379

WASHINGTON

Bunch 'A' Bytes C-64 Software Exchange
Joey Miller
4916 121st Place NE
Marysville, WA 98270
(206) 653-5675

OUTSIDE THE USA

CANADA

PET Educator Group (P.E.G.)
John Moore
P.O. Box 454
Station A
Windsor, Canada N9A 6L7

ENGLAND

Merseyside Commodore Users Group (ICPUG Affil)
Jeff Jones III
41 Virginia Avenue
Lydiate
Merseyside L31 2NN
United Kingdom
(051) 526-4813

FINLAND

User's Club of PTT
Contact: Sakari Natri
Teletutkimuslaitoksen
Mikrotietokonekerho
Kiviaidankatu 2 F
00210 Helsinki 21
Finland

MEXICO

Club Herra*Tec C64
Alain Bojmal
Vicente Suarez 25
06140, Mexico, D.F.

This Publication is available in Microform.

University Microfilms International

Please send additional information for _____

Name _____

Institution _____

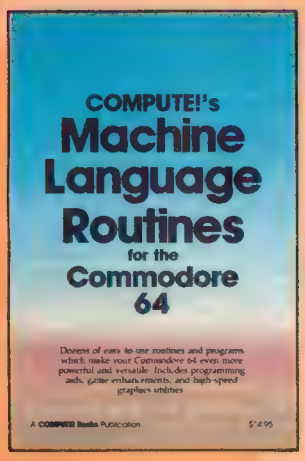
Street _____

City _____

State _____ Zip _____

300 North Zeeb Road, Dept. P.R., Ann Arbor, Mi 48106

COMPUTE! BOOKS

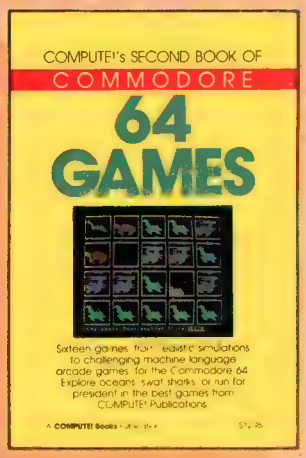


COMPUTE!'s Machine Language Routines for the Commodore 64

Edited

This collection offers ready-to-use machine language routines that can be easily inserted into BASIC programs, as well as stand-alone routines that make the 64 even more powerful. Valuable programming aids such as one-key commands and automatic line numbering are here. Routines useful in games and graphic design are also included. There are even complete machine language programs to help in the creation of custom characters and sprites.

$14.95
ISBN 0-942386-48-5
August

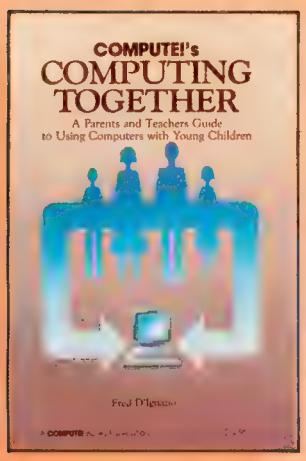


COMPUTE!'s Second Book of Commodore 64 Games

Edited

Sixteen outstanding games from detailed simulations to fast-paced machine language arcade games. Run for president in "Campaign Manager," defend yourself against sharks and acid rain in "The Frantic Fisherman," or photograph the Loch Ness monster in "Nessie." The best games from *COMPUTE!* and *COMPUTE!'s Gazette*, and some appearing here for the first time anywhere. Articles show you how to design a videogame and the intricacies of writing text adventures.

$12.95
ISBN 0-942386-64-7
September



Computing Together:

A Parents and Teachers Guide to Using Computers with Young Children

Fred D'Ignazio

Written in a clear and lively style by Fred D'Ignazio, popular columnist for COMPUTE! Publications, this book covers such topics as how to choose the right software for young children and what to expect from computer camps. Also included are two complete programs, ready to type in and play on a variety of home computers.

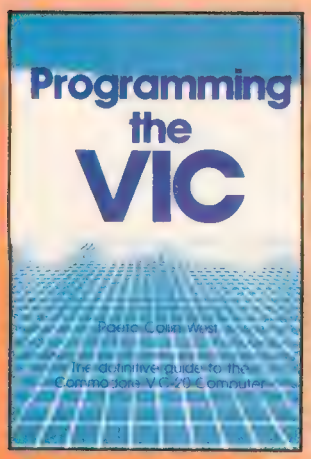
$12.95
ISBN 0-942386-51-5
July

VIC-20 and Commodore 64 Tool Kit: BASIC

Dan Heeb

This comprehensive guide to the BASIC ROM routines in the VIC and Commodore 64, thoroughly documented and clearly written, shows programmers how to call these routines from their own BASIC or machine language programs. Not only a how-to, the *Tool Kit* is also an extensive reference guide to this important part of Commodore BASIC. For intermediate to advanced programmers.

$16.95
ISBN 0-942386-32-9
September



Programming the VIC

Raeto Collin West

Raeto Collin West's previous book *Programming the PET/CBM* is considered *the* definitive Commodore PET/CBM reference work. *Programming the VIC* is of the same quality and on the same scale. It is destined to become the standard, the essential book on the VIC. It is packed with extensive, clear information on every aspect of the VIC-20. Nothing is left out and everything is illustrated with examples and sample programs. No other work covers the VIC as thoroughly or as clearly.

$24.95
ISBN 0-942386-52-3
October

COMPUTE!'s Commodore Collection: Volume 1

28 Original Programs for the VIC and 64

Edited

The *Commodore Collection*, an anthology of 28 previously unpublished programs for the VIC-20 and Commodore 64, continues the COMPUTE! tradition of practical programs in easy-to-use form. Includes exciting games, stimulating educational programs, valuable utilities, and useful applications to make your Commodore computer an exciting part of every day.

$12.95
ISBN 0-942386-55-8
July

To order your copy, call toll-free **1-800-334-0868** or write:
COMPUTE! Books, P.O. Box 5406, Greensboro, NC 27403

Please include a $2.00 shipping and handling charge per book on all book orders.

REVIEWS

EasyDisk

Harvey B. Herman,
Associate Editor

The Commodore 1541 disk drive is a "smart" peripheral. It has its own microprocessor and the Disk Operating System (DOS) is permanently installed in the 1541's memory. Some computers require that a memory reducing program be loaded into the computer before normal disk operations are possible. Not so the 64/1541 combination. Internally, the 1541 contains a sophisticated and unique operating system which requires no additional programming effort from the 64. You can load or save BASIC programs, and interact with the disk drive as soon as the system is turned on.

As you might expect, there is a catch. The disk commands can be clumsy and non-intuitive. They are easy to forget if you haven't used them in a while. Years ago, when the PET disk first came out (with the same disk commands), I purchased an off-brand disk drive, rather than learning the following:

```
open 15,8,15
print#15,"rO:newname=old
name"
close 15
```

I am reminded of the times when I see beginners gnashing their teeth. It's not easy to explain the RENAME command (or any of the others) to someone who has recently taken their first computer out of the box.

All Is Not Lost

Several better ways are now available to interact with the disk drive. The Wedge, included on the demonstration disk that comes with a new 1541, is a good example. Using the Wedge considerably shortens the above rename sequence to:

```
>rO:newname=oldname
```

This program surely has been a boon to beginners. However, you still must remember the awkward syntax and be aware of the published tricks which allow the wedge to be saved on another disk.

My favorite method for renaming is contained in BASIC 4.0, which was developed for the PET/CBM a number of years ago. It was designed to help the user with disk commands. The RENAME command is intuitive in this version of BASIC:

```
rename "oldname" to "newname"
```

A few companies are now offering BASIC 4.0 for the Commodore 64, but I wouldn't recommend this approach to everyone—the additional hardware is fairly expensive, and the interaction is still not really very friendly.

SOS For DOS

EasyDisk, supplied on a protected disk (no backups allowed), is an inexpensive aid for befuddled disk beginners. I was in that category at one point, and I would have welcomed this program then. To quote the 11-page manual, "If you've ever had trouble remembering or using the Commodore 64's disk drive commands, then you'll be glad you have *EasyDisk*." I concur.

Here's what you see when you load and run *EasyDisk* with your 1541 disk drive:

```
EASYDISK BY D. POHORYLES (C) 1984
LOAD      VIEW      REPLACE   PRINT     SAVE
VERIFY    BACKUP    RENAME    DELETE    COMBINE
RESTART   VALIDAT   NEWDISK
Diskname                                Blocks free
                Directory Entries
F1: HELP      F3: NEXT      F5: PREV      F7: CANCEL
F2: BASIC     F4: SETUP     F6: OPTIONS
```

You choose a command from the menu by moving the cursor to the appropriate item at the top of the screen and then pressing RETURN. For example, if you want to rename a file on disk, put the cursor on the RENAME command. Press RETURN and move the cursor to the filename you want to change. Press RETURN and you will then be prompted for the new name. What could be simpler?

If you forget what a command does, simply press the f1 key for help or the f6 key for the sub-commands available. It really is easy.

INTRODUCING

THE PRO-LINE TEAM

PAL 64
The fastest and easiest to use assembler for the Commodore 64. Pal 64 enables the user to perform assembly language programming using the standard MOS mnemonics. **$49.95**

POWER 64
Is an absolutely indispensible aid to the programmer using Commodore 64 BASIC. Power 64 turbo-charges resident BASIC with dozens of new super useful commands like MERGE, UNDO, TEST and DISK as well as all the old standbys such as RENUM and SEARCH & REPLACE. Includes MorePower 64. **$49.95**

TOOL BOX 64
Is the ultimate programmer's utility package. Includes Pal 64 assembler and Power 64 BASIC soup-up kit all together in one fully integrated and economical package. **$89.95**

SPELLPRO 64
Is an easy to use spelling checker with a standard dictionary expandable to 25,000 words. SpellPro 64 quickly adapts itself to your personal vocabulary and business jargon allowing you to add and delete words to/from the dictionary, edit documents to correct unrecognized words and output lists of unrecognized words to printer or screen. SpellPro 64 was designed to work with the WordPro Series* and other wordprocessing programs using the WordPro file format. **$49.95**

NOW SHIPPING!!!
TOLL FREE ORDER PHONE
1-800-387-3208

VISA · AMERICAN EXPRESS · MasterCard

†Commodore 64 and Commodore are trademarks of Commodore Business Machines Inc.
*Presently marketed by Professional Software Inc.

Specifications subject to change without notice...

WP64
This brand new offering from the originators of the WordPro Series* brings professional wordprocessing to the Commodore 64 for the first time. Two years under development, WP64 features 100% proportional printing capability as well as 40/80 column display, automatic word wrap, two column printing, alternate paging for headers & footers, four way scrolling, extra text area and a brand new 'OOPS' buffer that magically brings back text deleted in error. All you ever dreamed of in a wordprocessor program, WP64 sets a new high standard for the software industry to meet. **$49.95**

MAILPRO 64
A new generation of data organizer and list manager, MailPro 64 is the easiest of all to learn and use. Handles up to 4,000 records on one disk, prints multiple labels across, does minor text editing ie: setting up invoices. Best of all, MailPro 64 resides entirely within memory so you don't have to constantly juggle disks like you must with other data base managers for the Commodore 64. **$49.95**

PRO-LINE SOFTWARE

(416) 273-6350
755 THE QUEENSWAY EAST, UNIT 8,
MISSISSAUGA, ONTARIO, CANADA, L4Y 4C5

Commands And Options

There are a total of 24 commands, including options. Space does not permit a complete discussion of each one, but two will serve as examples—loading a BASIC program and printing a disk file.

Let's say you've already loaded *EasyDisk* and want to load a BASIC program. First, you would insert the disk with the desired program, type D and press RETURN. *EasyDisk* is now running and you are looking at its menu of commands. Now, press f4 to display an alphabetized directory from the inserted disk. (It is essential that you use the SETUP function, f4, whenever disks are changed.) Move the cursor to the LOAD command and press RETURN. Move the cursor to the program name which you wish to load and press RETURN. Exit to BASIC with f2. Your program is now ready to go. Re-entry to the *EasyDisk* menu can be done at any time by pressing D. Additional options are RELOCATE and APPEND, which allow you to load at another address and combine two BASIC programs, respectively.

If you have a Commodore 1525 (or compatible) printer, you can print program listings directly from a disk file. This procedure will not erase a BASIC program currently in memory. Enter the *EasyDisk* menu (again, with D). Press f4 if the listed program is on a new disk. Put the cursor on the PRINT command and press RETURN. Find the desired program in the directory and press RETURN. A listing will be sent to the printer. Options include FROM, UNTIL, and FROM-UNTIL, which print just a selected line range rather than the entire file. You may stop the printing at any time by pressing RUN/STOP.

EasyDisk is a fine program for beginners who have difficulty with disk commands. It simplifies the operation of the Commodore 1541 disk drive by presenting all the commands in an easy-to-follow menu. And it includes options not provided with the 1541 disk operating system.

On the negative side, a few minor points should be noted: The disk is copy-protected and only a 90-day warranty is

BRITISH INTELLIGENCE

INTRODUCES GAMES WITH INTELLIGENCE - AND FREE WORD PROCESSING ! ! !

From now until Christmas we are giving all of our customers a Christmas present. Every program we sell for the 64, IBM, VIC20 or TRS80 Color will include a free copy of Maxi-Pros - the handiest and easiest to use word processor available. Last year Maxi-Pros sold for $29.95. This year it is **FREE** with all **British Intelligence** Programs.

DUNGEONS OF MAGDARR - Serious D of D for up to 8 players. Features full 3d GRAPHICS! You get a choice of several characters that grow from game to game and are interchangeable with characters from our famous Dungeons of Death game. A real dungeon with level after level of monsters to conquer and treasures to find - all in hi-res 3d graphics.

Available On: TRS80C, IBM PC, CMD64

TAPE $19.95 DISK $24.95

QUEST - A different kind of Graphic Adventure, it is played on a computer generated mape of Alesia. You'll have to build an army and feed them through combat, bargaining, exploration of ruins and temples, and outright banditry! Takes 2 - 5 hours to play and is different each time.

Available On: TRS80C 16K, CMD64, VIC20 13K, MC10 16K, T99 (EXT. BASIC), IBMPC

TAPE $14.95 DISK $19.95

PYRAMID - ONE OF THE TOUGHEST ADVENTURES. Average time through the pyramid is 50 - 70 hours. Clues are everywhere and some ingenious problems make this popular around the world. FULL GRAPHIC ADVENTURE.

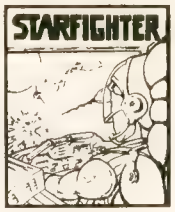
Available On: TRS80C 16K, CMD64, MC10 16K, IBM PC

TAPE $19.95 DISK $24.95

STARFIGHTER - The Best Blasted Spacewar Game I ever saw! Multiple screens, fantastic graphics, fast action - including one of the best first person battle scenes ever done. This will put you right in the turret.

AVAILABLE ON COMMODORE 64 ONLY

TAPE $24.95 DISK $29.95



MARS - Your ship crashed on the Red Planet and you have to get home. You will have to explore a Martian City, repair your ship, and deal with possibly hostile aliens to get home again. This is recommended as a first Adventure. It is in no way simple - playing time normally runs from 30 to 50 hours, but it lets you try out Adventuring before you battle the really tough ones. Full Graphics Adventure.

Available On: TRS80C, CMD 64, IBM PC

TAPE $19.95 DISK $24.95

BAG-IT-MAN - The ultimate arcade game for TRS80C or MCD64. This one has three screens full of BAGS OF GOLD, CARTS & ELEVATORS TO RIDE IN, MINE SHAFTS, and TWO NASTY GUARDS. Great sound and color and continuous excitement

Available On: TRS80C 32K, CMD64

TAPE $19.95 DISK $24.95

TO ORDER: Send amount indicated plus $2.00 shipping, per order. Include quantity desired and your preference of tape or disk. Be sure to indicate type of system and amount of memory.

BRITISH INTELLIGENCE

P.O. Box 8027
West Bloomfield, MI 48304

PHONE ORDES ACCEPTED
8:00 a.m. to 8:00 p.m. E.S.T., Mon-Fri

1-313-669-3123

NOW SHOWING

1541 FLASH!

AT COMMODORE 64™ DEALERS

FLASH! Gets the Gold at the Computer Olympics

The Skyles Electric Works *1541 FLASH!* dashed off with the gold at the Computer Olympics here.

The *1541 FLASH!* loaded and saved programs and files *three times faster* than an unenhanced Commodore 1541 disk drive could. Faster than any other disk drive with compatible disk format.

"...faster than any other disk drive..."

Three times faster! The device delighted the home crowd, which watched the *1541 FLASH!* set a meet record, and leave its competition in the dust.

Once installed, the *1541 FLASH!* is transparent. Computer operations all remain unaffected as it speeds up every disk-related function. The *FLASH!* is a permanent installation with both a software (ROM) and a hardware component. Through keyboard commands or a hardware switch, you can even return to the old, slow loading method—if you really want to.

And there is nothing new to learn for the *FLASH!* No special tricks or techniques. Once it's in, just watch it go.

But if you're really serious about programming, the *1541 FLASH!* is a gold mine. The manual will show you how to write software allowing data transfer to and from the 1541 disk drive at speeds up to *10 times* the normal.

For programs that usually load with a " "*",8,1" command, just hit Shift/Run-Stop. A spreadsheet program like BUSICALC 3 then loads in about 25 seconds.

The *1541 FLASH!* even adds 21 extra commands for the Commodore 64 user. Some of these include editing, programming and loading commands, as well as "DOS Wedge" commands. You can ignore all these commands, though, and just enjoy the rapid disk operations.

It wowed the crowd at the Computer Olympics. Once you see its sheer speed, you'll know why. Call its coach, Skyles Electric Works, to place your order or to get more info.

1541 FLASH!, an add-on assembly, for the Commodore 64/1541 costs only $89.95.

Skyles Electric Works
231E South Whisman Road
Mountain View, CA 94041
(415) 965-1735

Available from your local Commodore 64 dealer or call 1-800-227-9998.

1541 FLASH! is a trademark of Skyles Electric Works.
Commodore 64 is a trademark of Commodore.

offered. Personally, I don't care to see so many leading zeros in listings. Also, there appears to be a minor bug in the VIEW command. Listings to the screen of lines greater than 80 characters can temporarily disturb the bottom list of function key options. However, this happens only rarely.

Overall, *EasyDisk* is a fine product, especially for those just getting started, and for those who find that the lack of "friendliness" is interfering with their enjoyment of the Commodore 64 and 1541 disk drive.

EasyDisk
Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94089
$29.95

MusiCalc

Arthur B. Hunkins

In SID (Sound Interface Device), the Commodore 64 has the most powerful built-in sound generating capability on the market today. With the advent of *MusiCalc*, SID now has a sophisticated, flexible, and open-ended software system that realizes the lion's share of its sound-generating capability. Together, SID and *MusiCalc* make an excellent performance package which will appeal not only to serious hobbyists, but also to some professionals. *MusiCalc* is far and away the best music performance software that I've seen for the 64.

All of which is not to say that *MusiCalc* is either accessible or easy to use. Quite the contrary; sophistication comes at the expense of approachability. Be prepared to spend *days* exploring the potential of this package. Above all, be sure to work through the three tutorials first. Otherwise, you may find yourself thoroughly lost and frustrated. It took me the first day to get any sound at all, even though I knew music was supposed to be playing. Once I got the volume turned up, it took me another day to get the music to stop—quite a different matter from turning down the level.

The problem is not with the documentation, which—though somewhat scattered—is very good and thorough. It's very important to follow the manual because nothing is obvious, and there are no HELP screens (except for *MusiCalc3*, which we'll look at later).

An Open-Ended System

MusiCalc is a disk-based system, and the *MusiCalc1* disk is the heart of the system (there's a *lot* of software on it). A color monitor is recommended, but not required, since many functions—such as mode and voice selection—involve color coding.

But the system is powerful because it's open-ended. It interfaces with a number of external supporting programs (furnished), as well as numerous data files, some included on the system disk, others available as extra-cost "templates" (African/Latin Rhythm and Rock/New Wave are current titles.) And, of course, you make and store your own "songs" (compositions) along with up to 32 instruments to play them.

In addition to the master and template disks, there is another disk in the series, one capable of stand-alone operation: *MusiCalc3—Keyboard Maker.* This program turns the 64's keyboard into a one-voice musical instrument. The various files on the disk simply program the four rows of keys as four octaves (or more) of various scales. Its limitations are the single voice, the single staccato tone quality (one "instrument"), and distressingly slow keyboard response (you always have to think in advance of the sound). If you play too fast, some notes are skipped altogether. *MusiCalc3*'s primary utility comes in furnishing scales to *MusiCalc1* in Keyboard mode.

It's difficult in a review of modest proportions to convey an adequate impression of the variety of *MusiCalc*'s features. Clearly it was designed for future expansion: *MusiCalc4* will offer software and a keyboard; and *MusiCalc2: Scorewriter*, has been announced. The latter will allow music entered into *MusiCalc1* to be viewed or printed in actual notation, and—perhaps more importantly—will overcome the rather severe length limitations of *MusiCalc1* (16 × 15 total event/beats, each voice's pitch or rest counting as a separate event). *MusiCalc2* will extend compositional length by "chaining" several scores together.

GET ON THE FAST TRACK!

DiskMaker

with MasterKey

99% EFFECTIVE

THE AUTOMATIC DISK BACKUP-COPY SYSTEM FOR YOUR 64 & 1541 DISK DRIVE!

- Actually copies a FULL disk in only 3 MINUTES!
- Easiest to use – TOTALLY automatic copy utility
- State of the "ARTS" copy capability!
- UNLOCKS protected disks for backup copying
- Breaks through LATEST protection schemes
- Includes FAST copier, "ARTS" copier and TRUE Nibbler: you get 3 copiers for the price of 1
- HALF-TRACKING up to & including track 40!
- 100% machine code for fast, RELIABLE operation
- 3 min. copier AUTOMATICALLY puts "errors" on copy
- Fastest & most advanced copier you can buy
- Writes errors 20,21,22,23,27,& 29 WHILE COPYING!
- Transforms your 1541 into a SUPER-FAST copy drive!
- NO analysis required, just swap disks & NO damaging drive knock during errors or format
- Formats AS IT COPIES, detects & reproduces NON-STANDARD formats & I.D. mismatch, DOS flags
- PRODUCT SUPPORT tel. ?, revisions, & up-grades

COPIES OVER 500% FASTER THAN OTHER COPIERS!

ONLY **$49.95** for entire system

To order CALL **805-687-1541 ext. 64**
Technical line 805-682-4000 ext. 99

For rush service call 24 hr. order line or send cashiers check/money order. Visa, MasterCard, & American Express include card# and exp. date. CA residents add 6% tax. Allow 2 weeks for clearance of personal & co. checks. Add $3.50 shipping & handling for continental U.S./$5.50 for UPS air. AK, HI, APO, FPO, CANADA add $7.50. Other Foreign orders add $8.50. All APO, FPO, & orders outside 48 states must be paid by certified U.S. funds. C.O.D.'s shipped to U.S. addresses only, add $4.00. School orders welcome.

DISKMAKER PAYS FOR ITSELF THE FIRST TIME YOU USE IT!

basic

3463 State Street • Suite 1541A • Santa Barbara • CA 93105

A Programmable Synthesizer

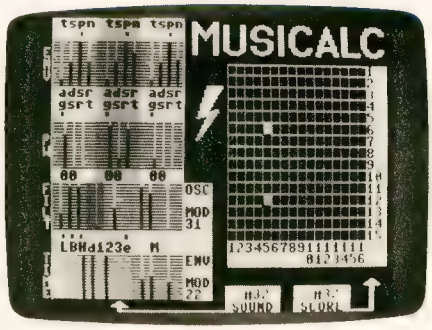
MusiCalc1 is a combination of *electronic synthesizer*—a SID chip parameter programmer—and *digital sequencer*, a timer/gate/pitch programmer. It is a three-voiced instrument that can be programmed to create a wide variety of electronic sounds, and that will play a sequence of these sounds with rhythmically independent voices according to pitch information stored in the sequencer (the "score"). The three synthesizer voices thus perform the three lines of a programmed composition ("song") contained in a sequencer file.

One of the more noteworthy features of *MusiCalc*—either a strength or weakness depending on intended use—is its "looping"; voices never actually stop, they just link, backward or forward, from one point to another. All links are absolute; no conditions are allowed. Thus, a set of notes cannot be played just twice, for example.

Nor can several voices play the same passage, exiting at different points to different destinations. For any "jumping off point" there is only one destination. Each voice has its own set of links, but the options basically boil down to infinite repetition or composing out each recurrence.

This linking method should appeal to arrangers who work with simple patterns, particularly those who want SID to be an accompaniment or backup for improvised solos. Other applications include commercials, background sound, and rhythmic music for dancing. It might also work well for composers of slow-moving, ostinato-based process music (manually varying parameters during performance, as described below). For more conventional composer/arrangers, the unconditional linking will seem more like a severe creative straightjacket.

It is possible, however, to program a composition to stop (or at least to seem to stop). The solution is to end each voice (they all loop independently) with a rest, and loop the rest back to itself. The only annoyance here is the clicking sound every time the sequence clock advances. (This click is soft, and is only noticeable when there is no sound.)



Visual Music

Each performance file contains 32 sets of instrument definitions and 32 scores; any score can be played by any of the 32 instrument combinations. The main *MusiCalc* display consists of a synthesizer panel with pots and switches on the left, and a 16 × 15 sequencer grid (for notes and rests) on the right. (See the accompanying photograph.) When a score/instrument file is called up, you can see the synthesizer settings and observe the voices and notes stepping through their position stages while the piece is playing.

During performance, there are a number of real-time options that can be exercised manually: You can change instrument definitions, tempo, volume; you can stop, start, or reset any and all voices (combinations allow the voices to get out of sync, which lead to fascinating interactions); you can also silence one voice, substituting (optionally recording) the keyboard as the third voice while the other two accompany.

Notes may be recorded a voice at a time, either by the keyboard in real time, or step by step (note by note); or—more like traditional notation—using a note name/octave, matrix system (a "score screen"). Furthermore, any of the three methods may be used later to edit a score.

As mentioned earlier, score capacity is presently limited. The maximum number of event/beats that can be stored per composition is 16 × 15 (240), where each event is a single pitch. Each event, or sequence step, is set to the lowest common rhythmic denominator. In other words, if you want to have a sixteenth note anywhere in your piece, the rhythmic beats (steps) must all be sixteenth notes, and all rhythms must be multiples of sixteenth notes (no triplets). Fast notes

Get more out of your Commodore for less!

SAVE UP TO 40% ON COMPUTE!'s GAZETTE

Yes! I want to get the most from my Commodore computer and save money doing it. Start my subscription to COMPUTE!'s Gazette right away!

☐ 1 year $24–Save $10 off newsstand price!
☐ 2 years $45–Save $24 off newsstand price!
☐ 3 years $65–Save $36 off newsstand price!

CALL TOLL FREE
800-334-0868

Name _____

Address _____

City _____

State _____ Zip _____

34N102

☐ Payment enclosed ☐ Bill me

Charge my
☐ Visa ☐ MasterCard
☐ American Express

_____ ___/___
Account No. Exp. Date

COMPUTE!'s GAZETTE
P.O. Box 961, Farmingdale, N.Y. 11737

Get more out of your Commodore for less!

SAVE UP TO 40% ON COMPUTE!'s GAZETTE

Yes! I want to get the most from my Commodore computer and save money doing it. Start my subscription to COMPUTE!'s Gazette right away!

☐ 1 year $24–Save $10 off newsstand price!
☐ 2 years $45–Save $24 off newsstand price!
☐ 3 years $65–Save $36 off newsstand price!

CALL TOLL FREE
800-334-0868

Name _____

Address _____

City _____

State _____ Zip _____

34N102

☐ Payment enclosed ☐ Bill me

Charge my
☐ Visa ☐ MasterCard
☐ American Express

_____ ___/___
Account No. Exp. Date

COMPUTE!'s GAZETTE
P.O. Box 961, Farmingdale, N.Y. 11737

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTE!'s GAZETTE

P.O. Box 961
Farmingdale, NY 11737

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY CARD

FIRST CLASS PERMIT NO. 2312 GREENSBORO, NC

POSTAGE WILL BE PAID BY ADDRESSEE

COMPUTE!'s GAZETTE

P.O. Box 961
Farmingdale, NY 11737

Get more out of your Commodore with

COMPUTE!'s GAZETTE™

For Owners And Users Of **Commodore VIC-20**™ And **64**™ Personal Computers

More fun

Martian Prisoner, The Viper, Skydiver, Snake Escape, Demon Star, Cyclon Zap and Oil Tycoon are just a few of the ready-to-run games you'll find exclusively in *COMPUTE!'s Gazette* each month. Just type in the programs and watch your screen explode with colorful new computer game excitement.

More challenge

Ready to tackle more advanced projects? In *COMPUTE!'s Gazette* you'll learn How to Use Tape and Disk Files. How to Program the Function Keys. Writing Transportable Basic. How to Make Custom Graphics Characters. New Ways to Enliven Programs with Sound. One Touch Commands for the 64. How to use Machine Language. Speeding up the VIC 20—and much more!

Children will learn and develop new skills with States & Capitals Tutor, Wordmatch, Munchmath, Wordspell, Connect the Dots, Aardvark Attack and Alfabug. *Computing for Kids*, a regular monthly feature, will uncover new ways to involve your children in computing.

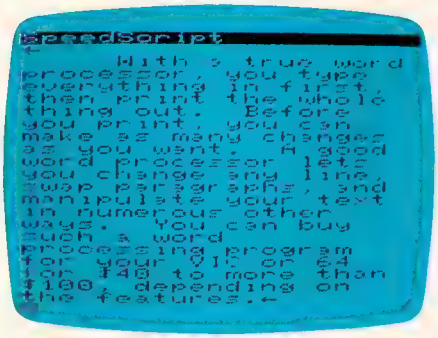
More programs

Programs to help you balance your checkbook, store your addresses, keep tax records, manage your personal business. You can create your own programs and games, improve your word-processing, spreadsheets and data base management, load and run faster with 64 Searcher, VIC/64 Program Lifesaver, Quickfind, Word Hunt, Disk Menu, VIC Timepiece, Automatic Proofreader and more.

$ $ $ $ $ $ $ $ $ $ $ $

More buying guidance

You'll profit from comprehensive reviews of everything from data-quality cassette tapes to software to graphics plotters and modems. Virtually anything that's compatible with your Commodore is reported on in *COMPUTE!'s Gazette*. With this kind of expert help, every computer purchase you make can be the right one!



More savings

You can save up to 40% off the newsstand price of *COMPUTE!'s Gazette* by subscribing now. All you do is mail the coupon below or the postpaid card bound into this issue. But don't delay! Subscribe now to start receiving every issue of *COMPUTE!'s Gazette*.

SAVE UP TO 40% ON COMPUTE!'s GAZETTE

Yes! Start my subscription to COMPUTE!'s Gazette at big savings off the newsstand price:

- ☐ 1 year $24—Save $10
- ☐ 2 years $45—Save $24
- ☐ 3 years $65—Save $36

Name _____

Address _____

City _____

State _____ Zip _____

☐ Payment enclosed ☐ Bill me

Charge my
☐ Visa ☐ MasterCard ☐ Am. Ex.

Account No. _____ Exp. Date ___/___

COMPUTE!'s GAZETTE **CALL TOLL FREE 800-334-0868**

P.O. Box 961, Farmingdale, N.Y. 11737

mean short pieces.

The tempo, along with all aspects of sound—instrument definitions, volume levels—are preset, and cannot be programmed to change during performance. (As mentioned, parameters may be changed manually, though this method is both limited and cumbersome.) Only pitches can change, and these solely at the beginning of sequence steps. Rests, ties, and slurs are easily specified, but the latter two cannot be entered in Keyboard mode—a real limitation.

Keyboard note entry is facilitated by the variety of scales resident on the master disk (there are many more on *MusiCalc3*). (Different tuning, transposition, even "tune up to your group" options are also included.) As in *MusiCalc3*'s stand-alone mode, however, keystroke action is markedly slow, and notes must be considerably anticipated to register at the next sequence point.

When the keyboard is used to record a voice, slurs and ties must later be edited in using the notationally-oriented matrix method. Additionally, keyboard rests are ungainly in that they must be entered by hitting the space bar. (Notes don't stop when keys are released; they sound until the next key is pressed, and keep restriking at sequence steps.)

Indeed, there seems to be a general limitation whenever GATE OFF is involved. The only way to program a rest is to specify a pitch in the zero octave. Here, as with SPACE bar usage in Keyboard mode, the frequency apparently goes to zero, but there is no GATE OFF. This causes an immediate cessation of sound, without any Release. It is most unfortunate that whenever an instrument with a positive Sustain level is followed by a rest, the Release is truncated. (This qualifies as a "bug" which should be corrected.)

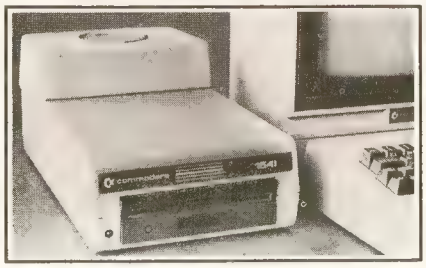
Ring modulation, sync, and test bit switching are all nicely implemented (Glissandos—slides—are not.) So also is a method for using the envelope and waveform values of Oscillator 3 for modulation purposes (filter, frequency, amplitude, etc.). (Audio output from Oscillator 3 can be switched on or off at will.) Each modulation type may control only one parameter. Implementation of modulation via the envelope shape is simple and straightforward; that using the waveform of Oscillator 3 is not.

There are several problems here. First, there is no flexible way to specify sub-audio "pitches" (frequencies) with which to modulate. (Even so, narrow, fairly fast vibrato is possible.) Second, the sampling of modulation waveform values is done at a high sub-audio rate of speed which is constant and non-variable; at large modulation amplitudes (modulation amounts are programmable) the steps are very noticeable. It would be very useful if the sampling rate itself were variable—from faster (to eliminate or minimize stepping) to very slow, for simulation of sub-audio sample/hold effects commonly available on analog synthesizers.

A Variety Of Good Features

Finally, here's a sampling of other notable features. Among the numerous supporting programs are those that show how to interface *MusiCalc* with user programs in BASIC, both while music is playing (*MusiCalc* is interrupt-driven) and while it is not. Complete disk management is possible from within *MusiCalc*. Instrument and score files can be merged and interchanged in various ways. There are random play, random linking routines. (A bonus, hidden in a supplementary score/instrument file, and unmentioned in the manual, is a selection of Christmas carols.) The

Uni-Kool
DISK DRIVE FAN FOR COMMODORE



Designed to work with Commodore Disk Drive Models 1540, 1541, and 1542, the quiet C-100 fan enclosure moves cool, filtered air through the top vents of the disk drive cooling the drive and thereby reducing the misalignment problems caused by heat build-up. A custom filter keeps room dust from entering the disk loading opening. This greatly increases the life span of the disk drives, and decreases the maintenance required to keep the drive functioning properly. Only $39.95 plus $2.00 for shipping and insurance.

115 vac
60 Hz
7 Watts

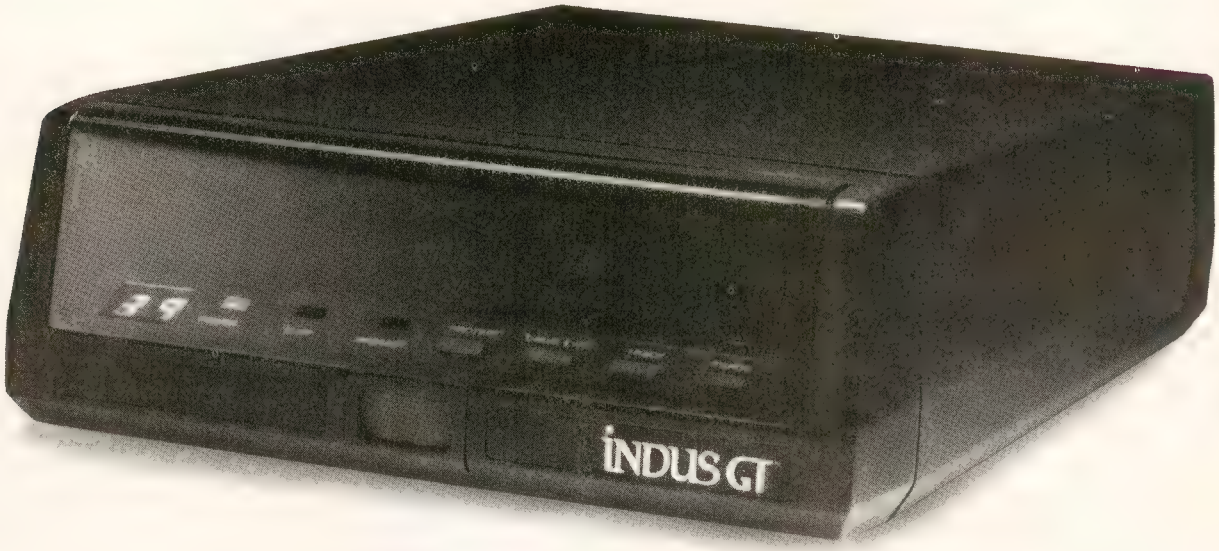
6-month warranty

Uni-Kool (503) 476-1660
909 Williamson Loop, Grants Pass, OR 97526

(Commodore is a registered trademark of Commodore Business Systems)

Now Available For COMMODORE

Looks like a Ferrari. Drives like a Rolls. Parks like a Beetle.



Ask your computer dealer to let you test drive the all new 1984 Indus GT.™

The most advanced, most handsome disk drive in the world.

Flip its power switch and...
Turn your Atari into Ferrari.
Unleash your Apple.
And now turbocharge your Commodore.

Looks like a Ferrari.

The Indus GT is only 2.65″ high. But under its front-loading front end is slimline engineering with a distinctive European-Gran flair.

Engaging its AccuTouch™ buttons lets you control the LED-lit CommandPost.™ Marvel at how responsive it makes every Commodore, Apple and Atari personal computer.

Drives like a Rolls.

Nestled into its soundproofed chassis is the quietest and most powerful disk drive system money can buy. At top speed, it's virtually inaudible...whisper quiet.

Built into each Indus GT is a perfect combination of craftsmanship and advanced engineering. Luxurious styling reflects the personal tastes of each GT owner.

And each GT comes with the exclusive *GT DrivingSystem*™ of software programs.* World-class word processing is a breeze with the *GT Estate WordProcessor*.™ Your dealer will describe the two additional programs that allow GT owners to accelerate their computer driving skills.

Also, the 1984 Indus GT is covered with the GT PortaCase.™ A stylish case that conveniently doubles as a 80-disk storage file.*

Parks like a Beetle.

The GT's small, sleek, condensed size makes it easy to park.

A WarrantyPlus™ package is included with every Indus GT, featuring full year parts and labor on the complete drive train.

Drive home a winner and park an Indus GT next to your personal computer.

INDUS™

The all-new 1984 Indus GT Disk Drive.

The most advanced, most handsome disk drive in the world.

*Included as standard equipment.

For dealer information, call 1-800-33-INDUS. In California, 1-800-54-INDUS, (213) 882-9600.

©1983 Indus Systems, 9304 Deering Avenue, Chatsworth, CA 91311. The Indus GT is a product of Indus Systems. Atari is a registered trademark of Atari, Inc. Apple is a registered trademark of Apple Computer, Inc. Commodore is a registered trademark of Commodore Business Machines, Inc.

package is attractively produced (disks come in handsomely designed jackets), and the glossary and appendices are very informative.

In short, this is a first-class, substantial music package that is thoughtfully conceived and packed with useful features. If you want to perform on or with the 64's SID chip, seriously consider *MusiCalc*. You couldn't make a wiser choice.

MusiCalc
Waveform Corporation
Music Products Division
1921 Bonita Way
Berkeley, CA 94704
MusiCalc1 $49.95
MusiCalc3 $34.95

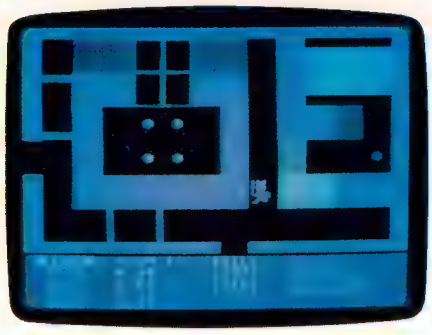
Adventure Creator

C. Regena

Adventure Creator for the Commodore 64, a cartridge-based program from Spinnaker, is a good introduction to what "adventure" programs are all about. We opened up the package one evening, and for the rest of the week I couldn't use the computer because my children were playing this game.

Adventure Creator comes in a colorful, vinyl case which holds the cartridge and a 26-page manual. You *must* read the instructions before you can play or design a game. The manual explains the flashing objects and barriers which drain your energy. Also, you need to read what the various "tools" are and how to use them with all the different types of creatures you may meet.

Dale Disharoon is the author of *Adventure Creator*, and this program, in my opinion, is a vast improvement over his earlier *Hey, Diddle, Diddle*. He also wrote the popular *Alphabet Zoo*. But Dale has some really innovative and fun ideas in *Adventure Creator*.



It's Your Choice

When the program starts, there is a main menu screen with the options AUTO, PLAY, SAVE, NEW, EDIT, and LOAD. Use a joystick to make your selection. AUTO gives you an adventure game to play. You then select B for Beginning or A for Advanced.

The computer then generates an adventure with a particular quest: Either find a certain treasure or gather a certain amount of wealth before the energy runs out. You use the joystick to move among the rooms and open treasure chests while avoiding energy-zapping traps and various creatures.

Each room is slightly different from the rest, so the game stays interesting. The program has good graphics and fun sound effects. There are distinctive sounds for opening treasure chests, going through flashing energy traps, shooting a ferret, meeting creatures, and ending the game.

The main feature of this program, however, is not just playing adventure games the computer generates, but creating your own adventure game. This is what classifies *Adventure Creator* as a "learning game." You may either EDIT an AUTOmatic game, or you can start fresh and design your own game. Once you create a masterpiece (or if you get interrupted and must continue later), you can easily save your game on tape or disk and load it later.

Designing Your Own Adventure

You'll probably want to start by sketching a map of rooms with numbers—from each room you may move north, south, east, and west—and you specify the room numbers of each connecting room. You can create up to 100 rooms. The program is designed well enough so that you cannot do things which are unacceptable to the program. For example, when you use doors, the computer keeps the doors on the walls where doors are acceptable, and there can be only one door per wall.

My favorite part was designing creatures. First, select CREATURES from the editing menu, and press the fire button. A Creature Lab screen appears

SUPER PRINTER PACKAGES

Gemini 10X and Cardco + G 339
Prowriter and Cardco + G 414
No additional shipping charges on Printer Packages in Continental USA

PRINTERS

Alphacom 40C/Int . 99.95
Alphacom 80C/Int 189.95
Epson ..... Call
Silver Reed ..... Call
Prowriter 8510 ..... Call
Legend 239
Riteman 289
Toshiba 1351 ..... Call
Toshiba 1340 ..... Call

COMMODORE 64

star micronics·inc
THE POWER BEHIND THE PRINTED WORD.

Gemini 10X	265	Delta 15X	579
Gemini 15X	389	Radix 10X	579
Delta 10X	419	Radix 15X	699

Powertype ... 379

CBM 64 ..... Call
SX-64 ..... Call
1541 Disk Drive ..... Call
1526 Printer 279
1530 Datasette 66
1702 Monitor ..... Call
1650 AD/AA Modem 89
RS 232 Interface ..... Call

Call for Special Package 64 System Price

MODEMS

Hayes Smart Modem 300 ..... Call
Mark VII/Auto Ans/ Auto Dial ..... Call
Mark XII/1200 Baud . Call
Prometheus ..... Call
Westridge AA/AD .. Call

ANIMATION STATION TOUCH TABLET ... 54.95

Bring the trivia craze home with **P.Q. The Party Quiz Game** for the CBM 64-D Call

C O M M O D O R E 6 4 S O F T W A R E

ACCESS
Neutral Zone-D/T 23.95
Spritemaster-D/T 23.95
Beachhead-D/T 23.95
Master Composer-D ... 27.95
Raid Over Moscow-D/T 27.95
Scrolls Of Abadon-D/T 23.95

ACCESSORIES
WICO Joystick ..... Call
Flip 'n' File-D 20.95
Flip 'n' File Cart 20.95
Joysensor 24.95
WICO Trakball 37.95
KRAFT Joystick 15.95
EIS Compuserve Kit ... 64.95
VIDTEX 29.95
Big Foot 16K Buffer ..... Call
Big Foot 32K Buffer ..... Call
Big Foot 64K Buffer ..... Call
Gemini 10X 8K Upgrade . Call
Monitors ..... Call
Compuserve Starter ... 27.95
Elephant SS/SD 17.00
Verbatim SS/DD 20.00
Elephant SS/DD 20.00
Ultra Magnetics SS/DD 18.00
Alien Voice Box II-D ... 99.95

ACTIVISION
Hero-D 24.95
Pitfall II-D 24.95
River Raid-D 24.95
Decatholon-D 24.95
Star League Baseball-D/T 23.95
On-Field Tennis-D/T . 23.95

AVALON HILL
Call for Items and Prices

BATTERIES INCLUDED
Consultant-D 69.95
Paperclip w/Spellpak-D 84.95
Super Busscard II ..... Call
Home Inventory-D 23.95
Recipe-D 23.95
Audio/Video Cat-D 23.95
Mail List-D 23.95
Stamps-D 23.95
B.I. 80 Card ..... Call
Home Pak-D 37.95

BRODERBUND
AE-D 23.95
Bank Street Writer-D .. 49.95
Choplifter-D 23.95
Drol-D 23.95
Loderunner-D 23.95
Operation Whirlwind-D . 27.95
Mask of the Sun-D ... 27.95
Dr. Creep-D 20.95
Gumball-D 20.95
Bungeling Bay-D 20.95
Spelunker-D 23.95
Stealth-D 23.95
Whistler's Brother-D .. 23.95

CARDCO
Cardprint/B 47.95
Cardco+G 64.95
Cardboard/5 ..... 59.95
Cardkey 39.95
Cassette Recorder 37.95
Printer Utility-D/T 19.95
Write Now-Cart 34.95
Mail Now-D 29.95
File Now-D 27.95
Graph Now-D 27.95
Spell Now-D 27.95
LQ-1 Printer ..... Call
LQ-2 Printer ..... Call
LQ-3 Printer ..... Call

CBS SOFTWARE
Call for Items and Prices

COMMODORE
Assembler-D 39.95
Easy Finance I,II, III,IV-D 19.95
Easy Calc-D 64.95
Easy Mail-D 19.95
Easy Script-D 44.95
Easy Spell-D 19.95
Logo-D 57.95
The Manager-D 39.95
General Ledger-D 39.95
Accts. Rec.-D 39.95
Accts. Pay.-D 39.95
Magic Desk-Cart 52.95
Int. Soccer-Cart 22.95
Magic Voice 54.95

DYNATECH
Adventure Writer-D ... 41.95
Codewriter-D 69.95
Dialog-D 41.95
Elf System-D 41.95
Home File Writer-D ... 41.95
Reportwriter-D 41.95
Menuwriter-D 34.95
Speedwriter-D 49.95

ELECTRONIC ARTS
Archon-D 29.95
Pinball Construction-D . 29.95
M.U.L.E.-D 29.95
Murder/Zinderneuf-D . 29.95
One On One-D 29.95
Archon II-D 29.95
Financial Cookbook-D . 37.95
Music Construction-D . 29.95
7 Cities Of Gold-D 29.95
Standing Stones-D 29.95

EPYX
Dragons/Pern-D/T ... 27.95
Mission Impossible-D . 23.95
Oil Barons-D 37.95

EPYX (cont'd)
Pitstop II-Cart 27.95
Puzzlemania ..... Call
Robots Of Dawn-D 27.95
Summer Games-D 27.95
Breakdance-D 27.95
Barbie-D 27.95
G.I. Joe-D 27.95
Hot Wheels-D 27.95
Impossible Mission-D . 27.95
World's Greatest Baseball-D 27.95

FIRST STAR
Astrochase-D/T 20.95
Bristles-D/T 20.95
Flip-Flop-D/T 20.95
Spy Vs. Spy-D 20.95

HANDIC
64 Forth-Cart 29.95
64 Graf-Cart 23.95
Stat 64-Cart 23.95
Calc Result Easy-Cart .. 34.95
Calc Result Adv.-Cart .. 69.95
The Diary-Cart 23.95
The Tool-Cart 29.95
Bridge Cart 29.95

HESWARE
Hesware ..... Call

INSTA (CIMMARON)
Insta-Writer-Cart 39.95
Insta-Mail-D 24.95
Insta-File-D 49.95
Management Combo ... 64.95
Insta-Calc-Cart/D 31.95
Insta-Graph-D 24.95
Insta-Vestor-D 31.95
Insta-Speed-D 99.95
Insta-Music-Cart/D ... 79.95
Invest Combo 74.95

INFOCOM
Deadline-D 29.95
Enchanter-D 23.95
Infidel-D 34.95
Planetfall-D 24.95
Sorcerer-D 34.95
Starcross-D 29.95
Suspended-D 29.95
Witness-D 34.95
Zork I, II, or III-D 27.95
Sea Stalker-D 24.95
Cutthroats-D 24.95

KOALA
Gibson Light Pen 69.95
Koala Touch Tablet-D .. 69.95
Koala Touch Tablet-C .. 74.95
Muppet Learning Keys-D 54.95

MICROFUN
Death in the Caribbean-D 27.95
Dino Eggs-D 27.95
The Heist-D 23.95
Boulder Dash-D 23.95
Short Circuit-D 23.95

MICROPROSE
Floyd/Jungle-D 23.95
Hellcat Ace-D/T 23.95
NATO Commander-D .. 23.95
Solo Flight-D/T 23.95
Spitfire Ace-D/T 23.95
Air Rescue I-D/T 23.95
Challenger-D/T 23.95
F-15 Strike Eagle-D ... 23.95

MISCELLANEOUS
Ken Uston's Blackjack-D 49.95
Quick Brown Fox-D/Cart . 34.95
Ultima III-D 41.95
Flight Simulator II-D ... 37.95
Night Mission/ Pinball-D/T 20.95
Home Accountant-D ... 49.95
Step By Step-D/T 44.95
Barron's Sat.-D 67.95
Bristles-D/T 20.95
Telestar 64-Cart 37.95
Castle Wolfenstein-D .. 20.95
Mastertype-D/Cart 27.95
Aztec-D 27.95
Miner 2049er-Cart 27.95
Strip Poker-D 23.95
Astro Chase-D/T 20.95
Flip Flop-D/T 20.95
Beyond Wolfenstein-D . 23.95
Sam-D 41.95
Mae Assembler-D 49.95
Jupiter Mission-D 34.95
Barron-D 37.95
Tycoon-D 37.95
Millionaire-D 37.95
Kwik-Load-D 16.95
Sargon III-D 34.95
Air Ralley-D 20.95
Graphics Basics-D 23.95
Hes Games-D 23.95
Multiplan-D 69.95
Omniwriter/Spell-D ... 41.95
Bruce Lee-D/T 23.95
Mancopter-D 27.95
Meridian III-D 27.95
Mastering The Sat-D . 104.95
Hes Forth-Cart 31.95
Pogo Joe-D/T 20.95
Movie Maker-D 41.95
Typing Tutor III-D 34.95
Space Taxi-D 20.95
Vip Terminal-D 39.95
Doodle-D 23.95

PARKER BROTHERS
Forgger II-Cart 34.95
Gyruss-Cart 34.95
James Bond-Cart 34.95
Popeye-Cart 34.95
Q*Bert-Cart 34.95
Star Wars-Cart 34.95
Montezuma's Revenge-C 34.95

SCARBOROUGH
Mastertype-D/Cart 27.95
Net Worth-D 54.95
Songwriter-D 27.95
Run For the Money-D .. 27.95

SCHOLASTIC
Call for Items and Prices

SCREENPLAY
Call for Items and Prices

SEGA
Call for Items and Prices

SIERRA ON-LINE
Championship Boxing-D 20.95
Dark Crystal-D 27.95
Frogger-D/T 23.95
Homeword Speller-D ... 34.95
Homeword-D 49.95
Mission Astroid-D 20.95
Oil's Well-D 23.95
Quest for Tires-D 23.95
Threshold-D 27.95
Time Zone-D 74.95
Ultima II-D 41.95
Ultima I-D 23.95
Ulysses-D 27.95
Wizard/Princess-D 22.95
Homeword w/Speller-D . 69.95

SPINNAKER
Adventure Creator-Cart .. 22.95
Aerobics-D 27.95
Alf in the Color Caves-C 22.95
Alphabet Zoo-Cart 22.95
Delta Drawing-Cart 22.95
Facemaker-Cart 22.95
Fraction Fever-Cart ... 22.95
Kids on Keys-Cart 22.95
Kidwriter-D 22.95
Snooper #1-D 22.95
Snooper #2-D 22.95
Story Machine-Cart .. 22.95
Trains-D 22.95

Hundreds of items available for the CBM 64, please call

D-Disk T-Cassette
Cart-Cartridge

SSI
50 Million Crush-D ... 27.95
Battle/Normandy-D/T . 27.95
Combat Leader-D/T ... 27.95
Computer Baseball-D .. 27.95
Cosmic Balance-D 27.95
Eagles-D 27.95
Fortress-D 23.95
Germany 1985-D 41.95
Knight/Desert-D/T ... 27.95
Professional Golf-D ... 27.95
RFD 1985-D 23.95
Ringside Seat-D 27.95
Tigers in the Snow-D .. 27.95
Baltic 85-D 23.95
Broadsides-D 27.95
Computer Football-D .. 27.95
Questron-D 27.95

SYNAPSE
Blue Max-D/T 23.95
Drelbs-D/T 23.95
Fort Apocalypse-D/T .. 23.95
Necromancer-D/T 23.95
New York City-D/T ... 23.95
Quasimodo-D/T 23.95
Relax Stress Reduction Sys. 94.95
Slam-Ball-D/T 23.95
Zaxxon-D/T 27.95
Zepplin-D/T 23.95

TIMEWORKS
Accounts Payable/ Checkwriter-D 41.95
Accounts Receivable/ Invoice-D 41.95
Cash Flow Management-D 41.95
Data Manager 2-D 34.95
Data Manager-D/T ... 19.95
Dietron-D/T 19.95
Dungeon Algebra Dragon-D/T 19.95
Electronic Checkbook-D/T 19.95
General Ledger-D 41.95
Inventory Management-D 41.95
Money Manager-D/T . 19.95
Payroll Management-D . 41.95
Evelyn Woods-D 49.95

TRILLIUM
Amazon-D 22.95
Dragonworld-D 22.95
Farenheit 451-D 22.95
Rendezvouz w/Rama .. 22.95
Shadowkeep-D 22.95

WAVEFORM
Call for Items and Prices

WINDHAM CLASSICS
Below the Root-D 19.95
Gulliver's Travels-D ... 19.95
Swiss Family-D 19.95
Wizard of Oz-D 19.95

To Order Call Toll Free
800-558-0003

For Technical Info, Order Inquiries, or for Wisc. Orders -
414-351-2007

NEW LOWER PRICES

NEW PRODUCTS

ComputAbility™

NO SURCHARGE FOR MASTERCARD OR VISA

ORDERING INFORMATION. Please specify system. For fast delivery send cashier's check, money order or direct bank transfers. Personal and company checks allow 2 weeks to clear. Charges for COD are $3.00. School Purchase Orders welcome. In CONTINENTAL USA, include $3.00 shipping per software order. Include 3% shipping on all Hardware orders, minimum $3.00. Mastercard & Visa please include card # and expiration date. WI residents please add 5% sales tax. HI, AK, FPO, APO, Canadian orders — add 5% shipping, minimum $5.00. All other foreign orders, please add 15% shipping, minimum $10.00. All goods are new and include factory warranty. Due to our low prices, all sales are final. All defective returns must have a return authorization number. Please call 414-351-2007 to obtain an RA# or your return will NOT be accepted for replacement or repair. Prices and availability are subject to change without notice.

COMPUTABILITY
P.O. Box 17882
Milwaukee, WI 53217

ORDER LINES OPEN
Mon-Fri 11 AM - 7 PM CST
Sat 12 PM - 5 PM CST

with one creature separate from the other ten—that's the one you get to design. With the joystick, move among the other ten shapes to choose the lower body and legs, then after choosing, press the fire button. Your shape takes on the body and legs you chose. Next, follow this same process to choose a head.

Selections then appear on the left side of the screen. COLOR determines the color of your creature. When you get the color you want, move to the next part of the designing process. The next word says OFF, but as you press the fire button, the choice cycles through OFF, SLOW, NORMAL, and FAST. This determines the speed of your creature. The creature you are designing moves as you change the word so you can select the exact speed you want.

The next choice to make is from BOUNCE, RANDOM, GUIDED, CHASE, HIDE, or STAND, so you can dictate how your creature will move in the room. The last selection is POP, TALK, ASK, TRADE, GIVE, ACCEPT, or ZAP, which determines whether your creature will be a helpful one or an enemy when it meets you in the game. If you select TALK, you can then type in the message the creature will say. If you select ASK, you must type in the question, and then the acceptable answer.

Pressing the space bar ends the creation. RETURN shows the creature in a test room so you can try out the movement of your creature.

The "Funnest" Computer Game

The *Adventure Creator* package suggests it's for ages 8 to adult, but the advertisements recommend ages 12 to adult. My family felt the latter rating is more reasonable because of the complexity of the game (and because you have to be able to read and understand the instructions). However, once an older person designed a game, my eight-year-old enjoyed playing it. Younger children can also

DI-SECTOR Version 2.0

EVERYTHING YOU EVER WANTED IN A DISK UTILITY . . . AND MORE!!
FOR THE COMMODORE 64*

- ★ Fully automatic back-up of almost any protected disk.
- ★ Copy files (PRG, SEQ, RND) with full screen editing.
- ★ Three minute back-up of standard disks (even many protected disks).
- ★ Format a disk in ten seconds.
- ★ View and alter sector headers.
- ★ Remove errors from any track/sector.
- ★ Edit sectors in HEX, ASCII — even assembler.
- ★ Create errors on any track/sector (20, 21, 22, 23, 27, 29) instantly.
- ★ Drive/64 MON, even lets you write programs inside your 1541.
- ★ All features are fully documented and easy to use.
- ★ None of our copy routines ever makes the drive head "kick."

Yes, you get all of this on one disk for this low price!

$39.95

VISA or MASTERCARD

add $3 for C.O.D.

. . . WRITE OR PHONE . . .
STARPOINT SOFTWARE
Star Route 10 Gazelle, CA 96034 (916) 435-2371

*Commodore 64 is a registered trademark of Commodore Business Machines

have fun playing the game and getting through the rooms looking for treasure, but they may not fully understand all the intricacies of the rooms and the tools.

My 13-year-old son said it was time-consuming but fun to build adventures. He enjoyed making his own creatures and changing the names of treasures. Although he favors arcade games, where he can put his initials in for top scores, he said *Adventure Creator* is the "funnest" computer game he has played.

Adventure Creator
Spinnaker Software
One Kendall Square
Cambridge, MA 02139
$39.95 (cartridge)

DROL And *Spare Change* For The Commodore 64

George Miller, Assistant Technical Editor

Brøderbund has recently released *DROL* and *Spare Change*, two new arcade-style games for the 64. Fast-paced and richly animated, these multilevel games will amuse arcade game players of any age group.

The Fantasy World Of *DROL*

A demonic witch doctor has lured a girl and a boy, their mother, and their pet lizard and crocodile into a strange and mesmerizing fantasy world. To rescue them, you must take on this world and its inhabitants, protected only by your trance-resistant, anti-gravity suit and an unlimited supply of reality pellets. From the onset your mission is fraught with peril. Scorpions, flying turkeys, and a magnet-tossing witch doctor—not to mention a honking vacuum cleaner—are among your numerous assailants.

Predict the Weather
On Your Vic 20™ or Commodore 64™ Computer

This exciting, new weather package allows you to learn, monitor, and predict the weather using the same equipment as the pros.

Be Your Own Weatherman

The new HAWS (Home Automatic Weather Station) combines a quality weather sensor with software to let you track weather conditions inside or outside your home. HAWS monitors weather data including dew point, temperature, humidity, and atmospheric pressure; plots historical data and graphically displays weather trends; determines the comfort and chill factors to help you dress; HAWS even forecasts the weather and compares your predictions to the local weatherman's.

HAWS uses the same sensor employed by weather services in 60 countries worldwide. The HAWS package costs only $199.95 and includes the sensor, cassette or floppy disc program, 15-foot cable with connector for the computer, and a complete user's manual.

Send today or call toll free to order your HAWS package.

Ordering Information
Send $199.95 in check or money order payable to Vaisala, Inc. Include name, address, telephone number, your computer model (VIC 20 or Commodore 64), and program preference (tape cassette or floppy disc).
Or call toll free to place your order.
Major credit cards accepted.
Dealer inquiries invited.

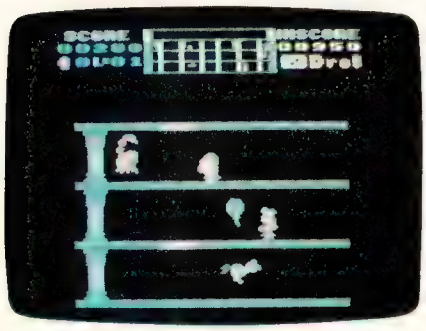
1-800-227-3800 ext. H-A-W-S

VIC 20 and Commodore 64 are trademarks of Commodore Electronics Ltd.

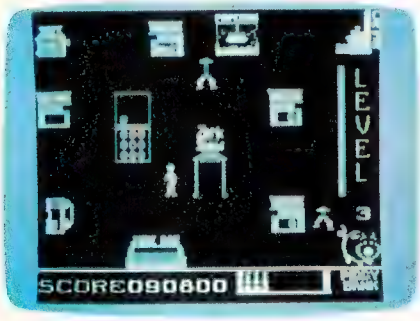
Learn/Teach Meteorology

More than a toy or game, HAWS provides the first opportunity to use your computer as a data sampler and data analysis system for meteorology, allowing the user to interact with incoming data to monitor and forecast weather conditions. HAWS includes an instructive software program and a complete user's manual that teaches meteorological terms and equations to allow anyone to quickly grasp weather concepts either at home or in the classroom. Simple plug-in components and easy hookup also means you can free up your computer at any time for other duties. HAWS is a great educational tool for anyone. Order today.

VAISALA
VAISALA INC.
2 TOWER OFFICE PARK
WOBURN, MA 01801



A scorpion is about to end this round of Drol.



The Zerks head for the popcorn machine in Spare Change.

DROL takes place in a four-tier maze, with trap doors allowing passage between tiers. Using your joystick, you roam up, down, and between the tiers, searching for the captive family and firing reality pellets at hallucinatory monsters. To help avoid ambush, you can refer to the radar scope at the top of the screen, which diagrams the movements of your bewitching adversaries.

There are seven levels of play. Within each level, you have three missions to accomplish. First, you must find the girl and her pet lizard (who wears a rocket pack). In the second mission, you must rescue the boy and the crocodile (also wearing a rocket pack). Then, if you've survived the onslaught of monsters and spells throughout these two missions, you'll find the mother tied up and anxiously awaiting rescue in the next level.

You begin with five lives. If you use up all of your lives before completing the three missions, you can start again at the first level. But if you successfully complete the three missions, you'll be rewarded with an extra life and a charming cartoon before advancing to the next level.

Because of the amount of graphics data in the program, there's a 30–45 second wait between missions and levels. This may dampen your momentum slightly; or it may provide a refreshing pause in a very fast-paced game.

Those who like intense action and unusual animation will find challenge and amusement in *DROL*.

Spare Change: The Frenzied Arcade

Another new release from Brøderbund is *Spare Change*, a nonviolent game that's especially fun for younger children. In this game, you are the harried owner of a video arcade, whose most popular characters—the Zerks—are threatening to retire. But, in order to leave, they must first pilfer five game tokens from your machines and place them in their piggy bank. So, as you scurry about collecting tokens from your machines and depositing them in your token bin, you must be on guard lest the Zerks snatch up any of your tokens.

The game begins with two tokens in each machine. Using either the joystick or the keyboard, you dash from machine to machine, collecting tokens and warding off Zerks. As the machines empty, you can refill them with money from the cash register; when the cash register runs low, you can fetch a money bag from the safe.

Since you alone are up against two Zerks—Ozzie and Zeke—it's not hard for them to outmaneuver you in their quest for tokens. But don't get discouraged: The Zerks are easily distracted. Play their favorite song on the jukebox, and they'll go over to it. Or put a token in the pay phone; when it rings, they'll race to answer it. Or they can easily be lured to the popcorn machine.

To adjust the level of difficulty in *Spare Change*, press f1. This calls up the "Zerk Control Panel," with which you can modify the Zerks' behavior to suit the player's skill. On the least demanding settings, my four year old can keep himself entertained for hours, something I've rarely seen on most other games. But other levels proved challenging enough for my ten year old and even myself.

Oddly, *Spare Change* is not a game which you can clearly

Sensational Prices!
. . . On Our Most Popular Items!

DUST COVER and "EVERYTHING BOOK"
INTRODUCTORY SPECIAL

Get to know us by ordering this great dust cover for your VIC-20 or Commodore 64 and our catalog, "The Everything Book for the Commodore C-64 and VIC-20 Home Computers," for $2.95 (no extra shipping or handling charges). Cover is antistatic, transluscent, 8 gauge vinyl sewn to our exacting standards with reinforced seams. Discover the savings and easy shopping available from Tenex Computer Express!

$2.95

31627 Dust Cover and Catalog

MSD SUPER DISK DRIVE
Maximum speed!
Commodore compatible!

You get more than Commodore compatibility with a MSD Super Drive. This "smart" drive with 4K buffer memory and space saving design is FAST . . . formats disks in 18 seconds! Will read disks for 1541 drives. Comes with serial cable for direct-connect to C-64 or VIC-20.

31365 ONLY **$339**

If sorcery fascinates you, try

WIZARD

The colors, graphics, sounds and action in this game are outstanding . . . even our best game players were impressed when WIZARD arrived at our offices! Jump from ropes to ladders, dodge plummeting boulders and duck under deadly arrows in your quest for gold and jewels. Find the key, cast spells, and enter the next level. 40 screens in all! Includes a construction set if you'd like to create your own levels. Watch for rave reviews! From Progressive Peripherals and Software. A sure winner!

31435 ONLY **$29.95**

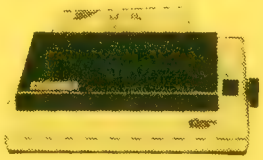
FREE CATALOG

Enjoy "The Everything Book" for the C-64 and VIC-20 at NO CHARGE! Filled with over 500 software descriptions, peripherals and accessories, and how-to information on expanding your system. Includes discounts and easy order information! Request part no. **25997**. Write to your friends at Tenex Computer Express at the address below!

Our best selling dot matrix printer . . .

GEMINI 10X

SALE!



$269

This famous printer from Star Micronics has a nine wire print head and bidirectional printing at **120** characters per second. Prints super high resolution bit image graphics. Comes with both tractor and friction feed. Requires one of the parallel interfaces listed below.

CARDPRINT B PRINTER INTERFACE
Quality standard parallel printer interface for VIC-20 and C-64. Includes all cables. From Cardco. Lifetime guarantee.
28603 ONLY **$44.95**

CARDPRINT +G INTERFACE WITH GRAPHICS
Top of the line from Cardco. Parallel printer interface with full graphics capability for VIC-20 and C-64. Lifetime guarantee
20623 ONLY **$69.95**

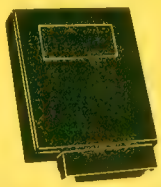
COMPUTER PAPER
Continuous 9½"x11" sheets of top quality 20# bond clear white paper. 540 sheets per package
29535 ONLY **$7.95**

Keep A Copy! Similar to above, but each page has two sheets for a carbonless copy. 350 pairs of sheets per package
29549 ONLY **$12.95**

OTHER GREAT PRINTER BUYS!
19179 Epson RX-80 ONLY **$299**
23564 BMC BX-80 ONLY **$259**
Friction & tractor, carbon ribbon!
21612 Gemini 15X; wide platen! ONLY **$449**

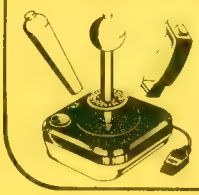
WESTRIDGE 64/20 MODEM

Check out these features - auto-answer, auto-dial and re-dial! This 300 baud direct-connect modem comes with terminal emulator software on disk. (Auto features not available on VIC-20).



31613 ONLY **$79.95**

NEW: GATE CONTROL JOYSTICK FROM WICO



Famous WICO quality is now available with Gatelock Control for 8-way or 4-way action (great for the precise action required by maze games). Also features 3-way handle. Choose the bathandle, redball or pistol grip control for your favorite action. You can't get more options on a joystick!

31173 ONLY **$24.95**

From Your Friends At

TENEX Computer Express

We gladly accept mail orders!

P.O. Box 6578
South Bend, IN 46660

Ad G1A

Questions? Call 219/259-7051

SHIPPING CHARGES

ORDER AMOUNT	CHARGE
less than $20.00	$2.75
$20.00-$39.99	3.75
$40.00-$74.99	4.75
$75.00-$149.99	5.75
$150.00-$299.99	6.75
$300 & up	7.75

NO EXTRA FEE FOR CHARGES

ORDER TOLL FREE
1-800-348-2778

win. If the Zerks get five tokens in their piggy bank, you lose; but if you get nine money bags in the bank, you simply move into a new round of play.

Excellent sound effects and delightful animation make *Spare Change* fascinating for younger children, while its strategy and variety can provide entertainment for others in the family as well.

DROL *and* Spare Change
Brøderbund Software
17 Paul Drive
San Rafael, CA 94903
$34.95 each, on disk

Also Worth Noting

Raid On Bungeling Bay

This addicting, yet frustrating, game pits your maneuverable attack helicopter against strong defenses. Your targets are six factories scattered across an archipelago. You must bomb the factories into rubble. But defending those factories are anti-aircraft guns, jet fighters, and even a battleship under construction. Convoys of small supply ships keep the factories producing, and jet bombers try to sink your base, an aircraft carrier. The pace is fast and frantic. There are so many things going on simultaneously that you almost need prescience to win.

Graphically, the game is excellent. Horizontal and vertical scrolling allow you to smoothly crisscross the island chain. The detail of the landscape below is extraordinary, complete with small buildings, roads, radar stations, ports, and drydocks. The missiles, fighters, bombers, tanks, ships, and even light gunfire flashes make this game a pleasure to watch.

But winning is difficult. Once you've destroyed one factory, jet fighters pursue your helicopter. After three factories are eliminated, heat-seeking missiles launch from the anti-aircraft positions and trail you for miles. And if the battleship sets sail, bound for your carrier, it's almost impossible to sink. Crashing your spinning helicopter onto its deck seems to be the best bet. *Raid on Bungeling Bay* is an arcade game in the classic sense—it's so hard to win that you end up playing it again and again, if only to say that you *can* beat the computer. If you win, you are treated to a front-page newspaper story describing

Supercharge Your Programming

Add far greater speed and versatility to your C64® or VIC-20® with Micol Systems' extraordinary new macro assembler package – System M2000

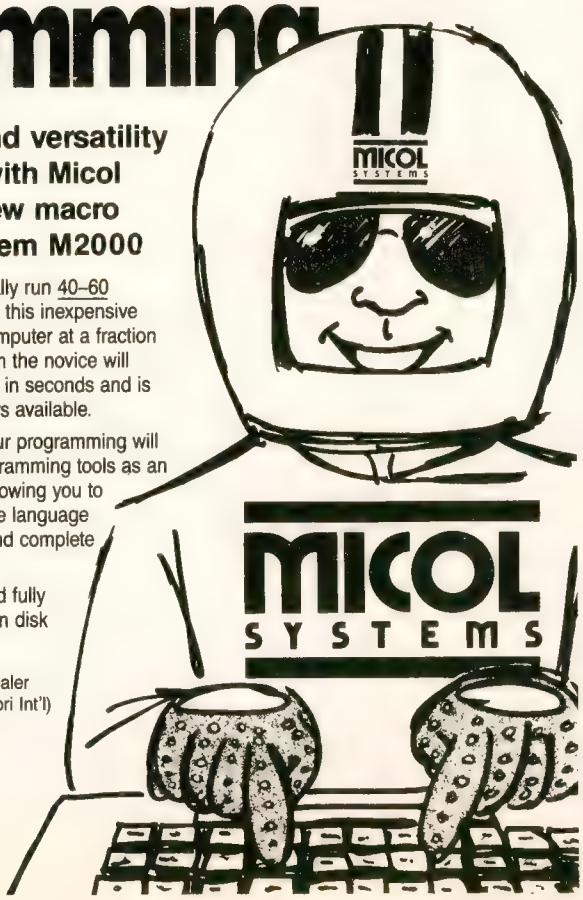
Since machine language programs usually run 40–60 times faster than their BASIC counterparts, this inexpensive package is like buying a more powerful computer at a fraction of the cost. A professional system that even the novice will find easy to use, it assembles kilobyte files in seconds and is one of the most powerful macro assemblers available.

But it's more than just an assembler. Your programming will be simplified with such well designed programming tools as an **Editor** which has all the handy features allowing you to create your programs easily and a machine language **Monitor**, a sophisticated debugging tool and complete man to machine language interface.

The package is 100% machine code and fully copyable for your convenience. Available on disk or cassette.

Available at finer computer outlets. For the dealer nearest you call Toll Free 1-800-225-2774 (Capri Int'l) in the U.S. and (416) 736-4402 (Access) or 1-800-387-9758 (Softcom) in Canada.

Micol Systems, 100 Graydon Hall Dr., Suite 2301, Don Mills, Ont. Canada M3A 3A9



I FEEL LIKE DANCIN'

THE GOLD DISK* SERIES

SOFTWARE AT A PRICE THAT WILL MAKE YOU DANCE

December Premier Issue

Includes:

- A complete data base system
- Feature article on data base systems
- Home Finance program & tutorial
- Learning Basic - Part 1 - tutorial
- 2 Arcade Action Games with full 3D Graphics !
- Music of the month
- Puzzles of the month
- Programmer's corner and MUCH MORE !!

All this for much less than the price of one game

Introducing the Gold Disk

A whole spectrum of quality software for your Commodore 64® on one disk.

Issued once a month, the GOLD DISK contains software to meet your every need. Programs that will educate, entertain and assist you.

GOLD DISK is committed to providing you with the best in high quality arcade style games, powerful and easy-to-use applications (word processing, data bases etc.) and enlightening tutorials.

SUBSCRIBE NOW and you can take advantage of this introductory offer

TO START RECEIVING THE GOLD DISK SERIES, MAIL THIS COUPON (OR FACSIMILE) TODAY!

THE GOLD DISK

The Perfect Christmas Gift

2179 Dunwin Drive, #6
Mississauga, Ontario
Canada L5L 1X3

Name _____

Address _____

City _____ State/Province _____ Zip/Area Code _____

☐ 6 months @ $54.95
☐ 12 months @ $99.95

Add $1.00 per issue for mailing and handling.
Orders out of North America add $3.00 per issue
Newsstand price per issue is $11.95 U.S
Ontario residents add 7% sales tax.

☐ Check or money order enclosed ☐ VISA ☐ Mastercharge

Acct # _____ Exp. Date _____ Signature of Cardholder _____

Prices in U.S. Funds. Do not forward cash by mail. Allow 4-6 weeks for subscription start.
Payment must accompany all orders.

* TRADEMARK PENDING

® COMMODORE 64 IS A REGISTERED TRADEMARK OF COMMODORE BUSINESS MACHINES INC.

DO MORE WITH YOUR Commodore

Discover Logo

Explorer's Guide to Commodore® Logo

(Webb, von Mertens, Holmes) Use your ingenuity and sense of curiosity to develop such Logo programming skills as making turtle graphics, saving programs, and editing programs. Follow the instructions and complete the exercises to reach Logo literacy as fast as possible. **#6465-9, $12.95**

Speak your computer's language

I Speak BASIC to My Commodore 64®

(Jones) Learn BASIC programming in 15 simple lessons with this remarkably successful program. Teaches you how to print words, draw pictures, solve problems, store information, retrieve information, compare information, play games, and do many other things to help you in everyday life.
#6172-2, $9.95

Build up your computing muscles

The Commodore 64® Computer Workout

(Software Lab East) Enjoy a good workout with your computer with this collection of more than 40 games. Includes crossword puzzles, word-searches, mix-n-match games, fill-in-the-blanks, and other challenging games designed for kids 7 and up.
#6467-5, $4.95

Help mom and dad around the house

Commodore 64™ Programs for the Home

(Sternberg) Learn how to use your Commodore for more productive things like home finance, car maintenance, utility bill analysis, meal planning, weight control, record keeping, and other household activities. Also available with programs on disk.
#5176-X, $15.95
With disk #7176-0, $29.95

Prices subject to change. © 1984 Hayden Book Company Commodore 64 is a registered trademark of Commodore Business Machines, Inc., which is not affiliated with Hayden Book Company.

At your local bookstore or Order Toll Free 1-800-631-0856 In NJ 201-393-6300

REVIEWS

your victory, followed by a parade in your honor.

Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
$29.95 (disk)

PuzzlePanic

Puzzle buffs will love this brain teaser from Epyx. It's a well-designed package from Ken Uston which offers eleven games, each with one to six levels. You can select any game and level or try to solve the MetaSequence, a master puzzle which requires that each game on every level be solved *in the right order*. The clues for each game are embedded within the game and the sequence itself is yet another puzzle. A joystick is required.

The games have a childlike appeal, although younger children may miss the nuances (but can enjoy the play). The animation is superb, as is the color. Sound and music, also well done, accompany each game. One of the more delightful—and puzzling—games we've seen.

Epyx
1043 Kiel Court
Sunnyvale, CA 94089
$35 (disk)

Gumball

In this entertaining strategy-action game from Brøderbund, you're a worker in a gumball factory. As various gumballs are produced and dropped down a chute, you open and close valves (with the fire button) in an intricate network of pipes and chutes. You must guide each color-coded gumball into its color-corresponding bin. Bins are guided with a joystick.

If that isn't enough, you must also meet your day's quota before the 5:00 whistle or start over. There are five levels, each progressively more difficult with higher quotas and more gumballs and bins to manage.

There are also a lot of comical features such as the plant manager stalking out and dumping the gumballs out of your bin if you erroneously guide a gumball into the wrong one. At the end of each completed level, you are promoted (foreman, supervisor, etc.) and rewarded with an interim cartoon screen which depicts your character walking home to a bigger and better house.

Gumball is a lot of fun, and also has value as a teacher of logic and hand-eye coordination. For all ages.

Brøderbund Software, Inc.
17 Paul Drive
San Rafael, CA 94903
$29.95 (disk)

64-Accounting

If you're looking for a package to do the bookkeeping for your household or small business, *64-Accounting* by Software Design, Inc., is well worth consideration.

There's no need to spend time setting up elaborate tables; *64-Accounting* does all the hard work. The documentation is well-organized and easy to understand. On-screen prompts and a menu help each step of the way.

We've Got People Talking

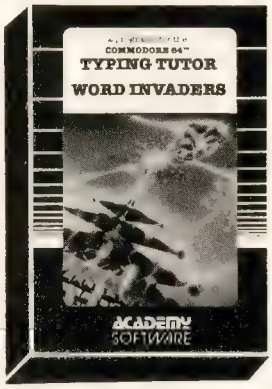
REVIEWERS SAY:

"This is the best typing tutor we have seen yet; ★ ★ ★ ★ +" **INFO-64**

"Computer aided instruction at its best." **Commander**

"This is an excellent program that makes typing practice an enjoyable pastime instead of boring drudgery." **DILITHIUM PRESS**

Rated the BEST educational program for the VIC 20 **Creative Computing**



CUSTOMERS SAY:

". . . delighted with my son's progress . . . he is the only one in his second grade class who touch types at the computer."

"Your Typing Tutor is an excellent program . . . our 4 children literally wait in line to use it."

"Thoroughly satisfied, can't believe how fast I've learned to type. I've never typed before."

In daily use by schools across the USA.

TYPING TUTOR + WORD INVADERS

Commodore 64™ . . . . . Tape $21.95
Commodore 64™ . . . . . Disk $24.95
VIC 20™ (unexpanded). . . . . Tape $21.95

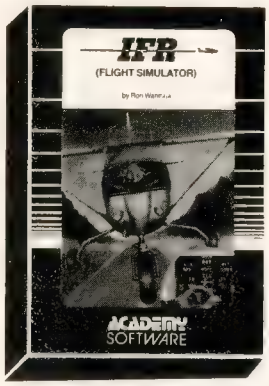
REALISTIC AIRCRAFT RESPONSE

"Has a quality of realism which sets it apart from others, even those I've tested in flight school." **Compute's Gazette**

"Great program!" **INFO-64**

"It is tremendous fun." **Compute's Gazette**

"Flight tested by an air traffic controller, two skilled pilots and an elementary school class. Highly recommended by all." **Midnite Gazette**



"This is an unbelievably realistic simulation of the difficulties facing a pilot in instrument flying. I'm a 747 pilot and I think that this simulation could do a lot to improve the reactions and instrument scan habits of even very experienced pilots." **747 pilot**

IFR (FLIGHT SIMULATOR)

Commodore 64™ . . . . . Tape or Disk $29.95
VIC 20™ (unexpanded). . . . . Cartridge $39.95
JOYSTICK REQUIRED

VISA Shipping and handling $1.00 per order. CA residents add 6% tax. MasterCard

ACADEMY SOFTWARE

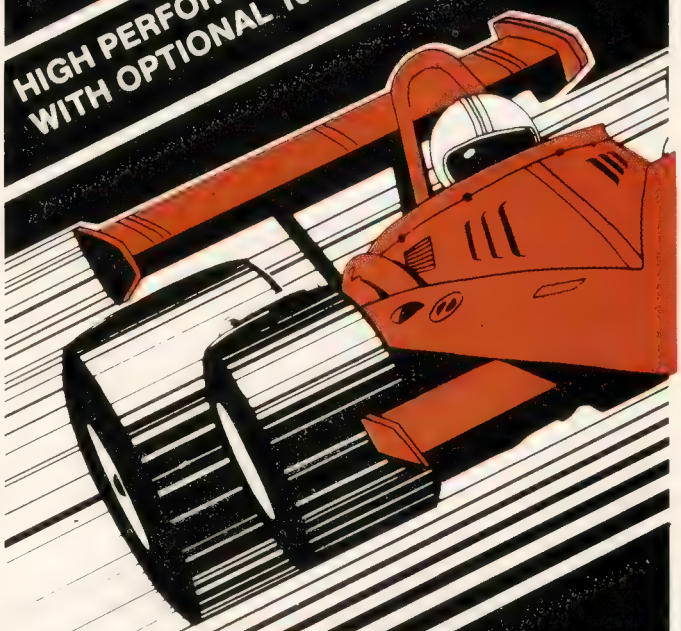
P.O. Box 6277 San Rafael, CA 94903 (415) 499-0850

Programmers: Write to our New Program Manager concerning any exceptional Commodore 64 program you have developed.

NEW FOR COMMODORE 64

TURBOPRINT/GT

HIGH PERFORMANCE PRINTER INTERFACE WITH OPTIONAL 16K or 32K TURBOBUFFER



THERE IS NO COMPETITION

PRINTS ENHANCED COMMODORE GRAPHICS • GRAPHIC DUMP ROUTINES INCLUDED • OPTIONAL 16/32K PRINTER BUFFER • PRINTS 4 TYPE FACES • EXTERNAL DIP SWITCH SELECTION • TESTED BY MANUFACTURERS OF MOST POPULAR "CENTRONICS" TYPE PRINTERS AND TYPEWRITERS.

DEALER INQUIRIES INVITED

Telesys

415-651-2970

43334 BRYANT ST., FREMONT CA 94539 TELEX 4992029

The program is designed for use with one or two disk drives, and can generate various printouts and reports. It can maintain up to 300 general ledger accounts, write checks, prepare statements, generate trial balances, and much more. It also keeps files of transactions, a general journal, a bank journal, and business identification accounts. Overall, *64-Accounting* is a complete and easy to use package.

Software Design, Inc.
1945 Mitchell Avenue
P.O. Box 570
Waterloo, IA 50704
$69.95

Montezuma's Revenge

Your mission in the new Parker Brothers' game, *Montezuma's Revenge*, is to guide Panama Joe through a maze of chambers in search of Montezuma's treasure. The diminutive hero encounters bouncing and rolling skulls, snakes, spiders, disappearing floors, laser gates, and fire pits.

Montezuma's Revenge has the best elements of such climbing games as *Jumpman* (rapid movement, good joystick control, jumping ability, a variety of obstacles) and of graphic adventure games (a complex maze of rooms, nine difficulty levels, special tools, and rewards to help you advance). The game *can* be frustrating in its difficulty, but there's extended play value in the challenges.

Parker Brothers
50 Dunham Road
Beverly, MA 01915
approximately $30 (disk)

Satan's Hollow

Commodore has created a first-rate conversion of the popular Bally/Midway arcade game, *Satan's Hollow*, for the 64. Such translations from powerful

MUSICAL CHRISTMAS DISC

SEND YOUR FRIENDS THE LATEST IN COMPUTERIZED GREETINGS

- For The Commodore-64
- Fully Personalized For Your Family Or Business Use
- Ten Christmas Carols, Each With Its Own Full-Color Bit-Mapped Graphic Scene.

Master Disc – $24.95
Ten Blank Discs (With Mailers) – $29.95

(California residents add 6% for sales tax.)

Be sure to include all needed personalization information, such as family member's names.

ORION ENTERPRISES
10221 Slater Ave., Suite # 103
Fountain Valley, CA 92708

COMMODORE 64
AUTO DIAL-AUTO ANSWER MODEM

This is everything you need to connect your C64 to the outside world. All in one package!

HARDWARE
- Direct-Connect/Auto Answer-Dial
- Bell 103/113 Compatible
- 300 Baud
- Voice/Data Switch

SOFTWARE
- Smooth Scrolling Display
- Set-up Menu/Function Key Modes
- 24K Buffer W/Review & Printer Dump
- Programmable Baud, Display, Parity, Wordsize, Stopbit, Linefeed
- Both Color & B/W Video Signal

SEND $89.00 (plus $2.00 shipping) to:

SOUTHWEST MICRO SYSTEMS Inc.
2556 Royal Lane
Dallas, Texas 75229
Or Call Toll Free 1-800-527-7573
In Texas Call (214) 484-7836
Free Catalog Upon Request

We accept:
VISA, Mastercharge & A.E.

NEW!
Universal Parallel Graphics Interface

- Built-in self-test with status report
- Optional RAM printer buffer
- Provides virtually total emulation of Commodore printers for compatibility with popular software
- ASCII conversion, total test, Emulate & transparent mode
- Fully intelligent interface that plugs into standard Commodore printer socket
- Exclusive graphic key-match function
- Switch selectable Commodore graphics mode for Epson, StarMicronics, C.Itoh, Prowriter, Okidata, Seikosha, Banana, BMC, Panasonic, Mannesman Talley & others.

Micrografix MW-350 . . . . . $129.00
MW-302C Printer Interface also available at $79.95

Dealer inquiries invited.

Micro World Electronix, Inc.
3333 S. Wadsworth Blvd., # C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671

arcade machines to home computers are never easy and often disappointing. But *Satan's Hollow* is quite good.

As you listen to the synthesized strains of Wagner's *Ride of the Valkyrie,* you attempt to build a bridge over a river of fire in order to reach the bonus round and fight Satan himself. Attacking you are waves of demons and other creatures—including a "Devil's Head," which shoots broad streams of fire. The background becomes progressively darker as the game continues and the demons are more difficult to see when night falls. The action is limited to two screens, and consists of rapid firing and quick dodging while you carry parts of the bridge from one side of the screen to the other.

If you enjoy fast-action "alien-invader" arcade games, you'll appreciate *Satan's Hollow.* One word of warning: On some monitors we found the color combinations made it difficult to see the main character on a portion of the bonus round's screen; not enough of a problem to ruin the game, but a limiting factor.

Commodore Business Machines, Inc.
Computer Systems Division
1200 Wilson Drive
West Chester, PA 19380
$34.95 disk

To receive additional information from advertisers in this issue, use the handy reader service cards in the back of the magazine.

Turn your own Commodore 64 into a graphic workstation: $149

FLEXIDRAW™ is the exciting and affordable Light Pen/Software System for people who need drawings, schematics, plans, layouts or graphics in their work.

A REAL WORKING TOOL THAT'S FUN TO USE. Be more productive right away. Draw and fine-tune design ideas right on your CRT . . . with your Light Pen. Then generate drawings or hard copies in black and white or color quickly and effortlessly.

And because you're unconcerned with computer commands you can focus on what you're working on. Fact is, work becomes a lot more fun.

FEATURE-RICH GRAPHICS AT YOUR LIGHT PEN TIP. Select from a wealth of drawing modes listed on the screen. Move fluidly from freehand drawing to lines, boxes, arcs, circles, ellipses, zooms, cross hairs, grids. Plus, flips, rotations and split screens . . . virtually all the functions you'll ever need.

FLEXIDRAW gives you the freedom to manipulate and handle images as you work. Create your own templates and patterns to go with the standard Flexidraw templates and 512 pattern fills. There's seven different type styles for text. And 16 hi-res colors may be added. There's also a Sprite Editor and Animator. An exclusive Transgraph feature even lets you send graphics to distant locations via modem.

EXCLUSIVELY ENDORSED BY THE U.S. COMMODORE USERS GROUP. Test draw FLEXIDRAW yourself at your nearest Commodore Software dealer now.

P.O. Box 85152 MB 290, 7677 Ronson Road, San Diego, CA 92138, (619) 268-8792

UNITED STATES COMMODORE USERS GROUP ENDORSED

©INKWELL SYSTEMS, 1984

Flexidraw™
INKWELL SYSTEMS
"A Pen for Your Thoughts"

Richard Mansfield, Senior Editor

Getting Started

If you've never programmed in machine language (ML) because you thought it was too complicated, here's your chance. There are some new concepts and techniques to study. They seem strange at first, but they're essentially just new words and punctuation to instruct the computer to accomplish the same things you've been doing all along in BASIC. Loops are still loops. Branching is still branching.

Programming, ultimately, is programming—whatever the language. Give machine language a try; it's easier than you think and runs astonishingly fast.

Your Main Tool

This month we'll provide your main tool, an *assembler* program, and we'll use it to write a simple VIC and 64 program which lets you view some interesting places in your computer's memory. (You'll need at least 8K memory expansion on a VIC.) Ironically, this assembler (the tool you use to create ML) is written in BASIC. However, for beginners, it is a good learning tool. You can write short routines and test them on the spot.

If you type in the assembler (Program 1) on a Commodore 64, be sure to use standard Commodore abbreviations in line 244 so it will fit; this isn't a problem on the VIC with its longer program lines. Use ? for PRINT, P SHIFT-O for POKE (but don't abbreviate the word POKE where it appears within quotes), and G SHIFT-O for GOTO. This is the only line you need to worry about.

Machine language programs are written in very small steps. You enter a single command at a time, usually followed by a number. This number represents the address affected by the command.

For example, the purpose of the first few lines in the ML programs below is to fill color memory. On the 64, we want to POKE the number 7 into the entire color memory; on the VIC we want to POKE a 5. So we first "load" a 7 or 5 into the Accumulator (a temporary storage area in the 6502/6510 chip) by using the command LDA #7 or LDA #5. This sets things up so that we can keep POKEing over and over without having to reload the original number. It's like a POKE submachine gun.

VIC Memory Display Routine

```
830 LDA #5
832 LDY #0
834 STA 37888Y
837 STA 38144Y
840 DEY
841 BNE 834
843 LDX #0
845 LDA 0X
847 STA 4096X
850 LDA 512X
853 STA 4352X
856 DEX
857 JMP 845
```

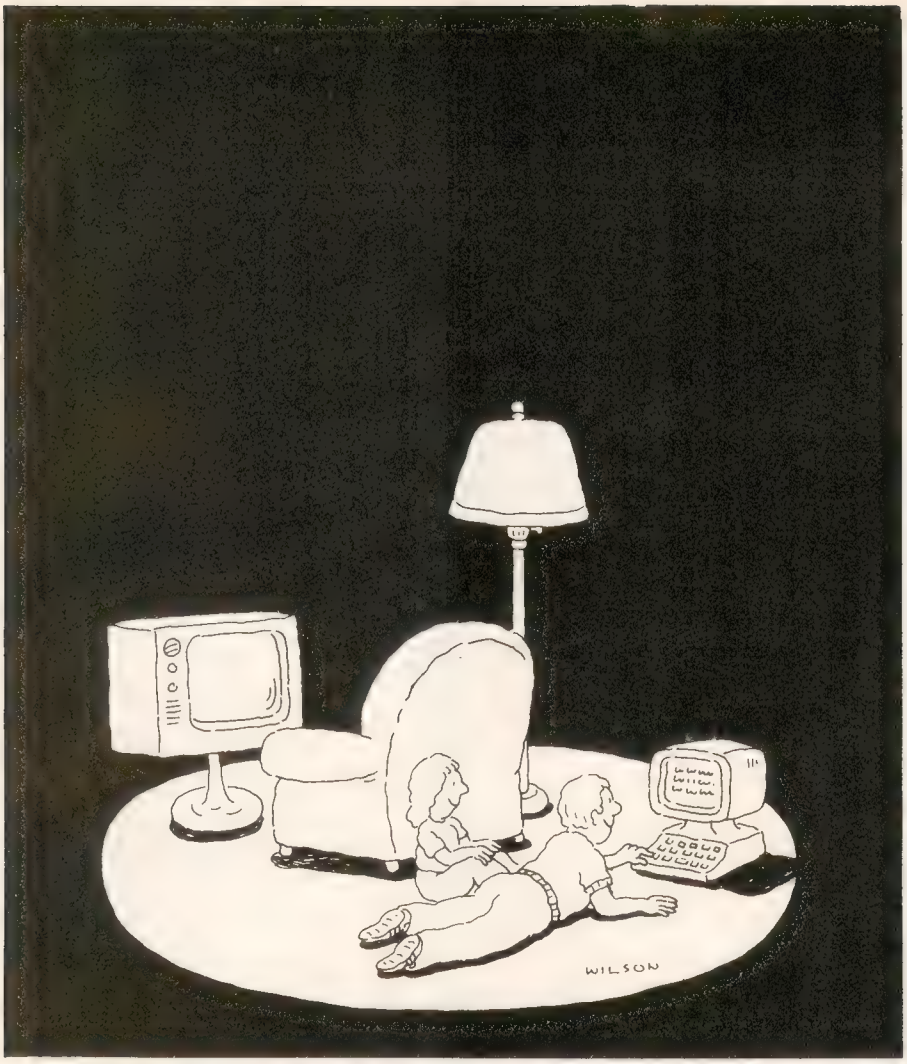
64 Memory Display Routine

```
830 LDA #7
832 LDY #0
834 STA 55296Y
837 STA 55552Y
840 STA 55808Y
843 STA 56064Y
846 DEY
847 BNE 834
849 LDX #0
851 LDA 0X
853 STA 1024X
856 LDA 512X
859 STA 1280X
862 LDA 53248X
865 STA 1536X
868 LDA 56320X
871 STA 1792X
874 DEX
875 JMP 851
```

Addressing Modes

The # symbol is an *addressing mode*. The 6502 chip inside our computers understands a variety of addressing modes. When you precede a number with the # symbol you are telling the chip toload the actual number 5 rather than whatever happens to be in *address* 5. LDA 5 would, by contrast, look at your RAM memory and put whatever it found in this byte into the Accumulator.

Let's use the VIC disassembly, as our example as we learn a few ML techniques. (A *disassembly* is an ML program listing. You can see a disassembly by using a disassembler program.) After putting the 5 into the Accumulator, we



Complacency or curiosity?

Move your children away from the passive nature of TV and turn them on to the excitement and fun of interactive learning with Dow Jones News/Retrieval®

You probably thought Dow Jones News/Retrieval only provided business and financial information. *Wrong.* We've got something of value for the whole family.

With our 20-volume, 30,000 article Academic American Encyclopedia, Dow Jones News/Retrieval will pique your children's curiosity about the world and help them develop new skills. The information they need for school is easy to access, always up-to-date, always ready. And kids love to use it!

There are timely news reports from Washington, our nation and the world. You also get current schedules and rates from the Official Airline Guide,™ Comp-U-Store, a convenient shop-at-home service; Cineman Movie Reviews; sports highlights, weather reports and MCI Mail—the new electronic mail service that lets you send letters to anyone, *anywhere,* even if he or she doesn't own a terminal.

Overall, you'll find a wide variety of high-quality data bases accessible quickly and easily with most personal computers.

To get your children involved, excited and turned on to the fun of learning, turn them on to Dow Jones News/Retrieval.

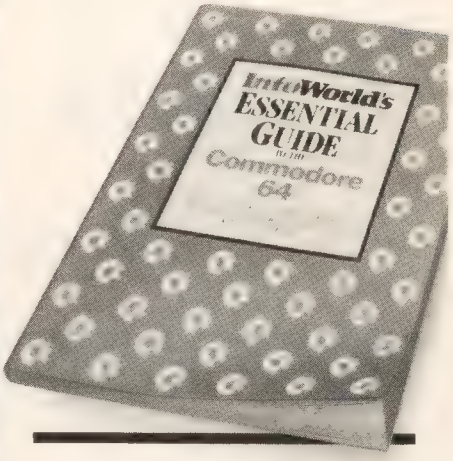
DOW JONES NEWS/RETRIEVAL®

Copyright ©, 1984 Dow Jones & Company, Inc. All Rights Reserved.
Dow Jones News/Retrieval® is a registered trademark of Dow Jones & Company, Inc.

FOR FULL DETAILS, CALL 800-345-8500, EXT. 5

Alaska, Hawaii and foreign, call 1-215-789-7008, Ext. 5

© 1984 Harper & Row
Commodore 64 is a trademark of
Commodore Business Machines Inc



TAKE COMMAND OF YOUR COMMODORE.® $16.95.

Here's the indispensable source on the choice, care and feeding of your Commodore 64. Everything you'll ever need to know about your 64: inside, up-to-date advice on the hardware; critical reviews of the software; and even an exhaustive look at the peripherals.

InfoWorld's Essential Guide to the Commodore 64 has been written by Richard A. Milewski, an authority on the Commodore, and the editors of InfoWorld, the respected voice of the industry.

Now, you can take command of your Commodore instead of deserting ship.

Please send InfoWorld's Essential Guide to the Commodore 64. I enclose $16.95 + $1.50 postage & handling (and any sales tax).

NAME _____

ADDRESS _____

CITY _____

STATE _____ ZIP _____

☐ MasterCard ☐ Visa ☐ AmEx

Card #: _____ Exp. ____

Send to: Harper & Row
10 East 53rd Street, 20th floor
New York, NY 10022

Or call toll free 800-638-3030.
(In MD, call collect 301-824-7300.) Or see your local bookseller or computer store.

Harper&Row

COMPUTER AND SOFTWARE SALE

COMMODORE 64

(more power than Apple II at 1/3 the price)

$188.00★

- 170K Disk Drive $249.00★
- Tractor Friction Printer $169.00★
- 14" Hi-Res Color Monitor $219.00★

*less coupon discount

WE HAVE THE BEST SERVICE

WE HAVE THE LOWEST PRICES

128K SYSTEM

(lowest price in the USA)

$895.00★

Includes

128K Commodore Computer
One Megabyte Dual Disk Drive
100CPS Tractor Friction Printer
12" Hi-Res Amber Monitor

★ COMMODORE 64 COMPUTER $188.00

You pay only $188 00 when you order the powerful 84K COMMODORE 64 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of savings applied your net computer cost is $88 00!!

★ 170 DISK DRIVE $249.00

You pay only $249.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON with your disk drive that allows you to SAVE OVER $100 off software sale prices!! With only $500 of savings applied, your net disk drive cost is $149 00

★ 80 COLUMN 80CPS TRACTION FRICTION PRINTER $169.00

You pay only $169 00 when you order the Comstar T/F deluxe line printer that prints 8½x11 full size, single sheet, roll or fan fold paper, labels etc. Impact dot matrix bidirectional, LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER $500 off software sale prices!! With only $100 of saving applied your net printer cost is only $69.00

★ 14" HI-RES COLOR MONITOR $219.00

You pay only $219 00 when you order this 14" COLOR MONITOR with sharper and clearer resolution than any other color monitors we have tested! LESS value of the SPECIAL DISCOUNT COUPON we pack with your monitor that allows you to save over $500 off software sale prices!! With only $100 of savings applied your net color monitor cost is only $119 00 (16 Colors)

80 COLUMN BOARD $99.00

Now you program 80 COLUMNS on the screen at one time! Converts your Commodore 64 to 80 COLUMNS when you plug in the 80 COLUMN EXPANSION BOARD!! PLUS 4 slot expander! Can use with most existing software

80 COLUMNS IN COLOR EXECUTIVE WORD PROCESSOR $49.00

This EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 computer! The ULTIMATE FOR PROFESSIONAL Word Processing DISPLAYS 40 or 80 COLUMNS IN COLOR or Black and White! Simple to operate, powerful text editing with 250 WORD DICTIONARY, complete cursor and insert/delete key controls line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers! Includes a powerful mail merge

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE DISCOUNT COUPON with every COMMODORE 64 COMPUTER DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER $500 OFF SALE PRICES!!

(Examples)
PROFESSIONAL SOFTWARE
COMMODORE 64

Name	List	Sale	Coupon
Executive Word Processor	$99 00	$49 00	$39 00
Executive Data Base	$69 00	$35 00	$24 00
20,000 Word Dictionary	$24 95	$14 95	$10 00
Electronic Spread Sheet	$59 95	$49 00	$39 00
Accounting Pack	$49 00	$39 00	$29 00
Practicalc	$59 95	$46 95	$39 95
Programmers Reference Guide	$20 95	$16 95	$12 50
Programmers Helper (Disk)	$59 95	$39 95	$29 95
80 Column Screen (Disk)	$59 95	$39 95	$29 95
FUJI 5¼" Floppy Disc (Box of 10)	$39 95	$29 95	$19 95
Deluxe Tape Cassette	$89 00	$59 00	$48 00
Pro Joy Stick	$24 95	$15 95	$12 00
Light Pen	$39 95	$16 95	$14 95
Dust cover	$8 95	$6 95	$4 60
Pogo-Joe	$29 95	$19 95	$16 95
Pitstop II Epyx	$39 95	$29 95	$26 00*

*Plus One FREE

(See over 100 coupon items in our catalog)
Write or call for
Sample SPECIAL SOFTWARE COUPON!

EXECUTIVE QUALITY
PROFESSIONAL BUSINESS SOFTWARE

The Cadillac of Business Programs
for Commodore 64 Computers

Item	List	*SALE	Coupon
Inventory Management	$99 00	$49 00	$35 00
Accounts Receivable	$99 00	$49 00	$35 00
Accounts Payable	$99 00	$49 00	$35 00
Payroll	$99 00	$49 00	$35 00
General Ledger	$99 00	$49 00	$35 00

★ 128K COMPUTER SYSTEM $895.00

Includes 128K COMMODORE B-128 COMPUTER, One megabyte Dual Disk Drive, 100CPS, Bidirectional Tractor/Friction printer, 12" Hi-Res Amber monitor; all for only $895. List $3718 00

COM-64 POWER FOR VIC-20 $69.00

Just plug in our 32K RAM MEMORY EXPANDER and you get as much usable programming power as the Commodore-64 computer!! Master control switches on cover. Gold Edge connectors, five year warranty (FREE $29 95 CARTRIDGE GAME)

NEW VOICE SYNTHESIZER $59.00

For Com-64 or VIC-20 computers Just plug it in and your can program words and sentences, adjust volume and pitch, make talking adventure games, sound action games and customized talkies!! FOR ONLY $19.95 you can add TEXT TO SPEECH, just type a word and hear your computer talk—ADD SOUND TO "ZORK", SCOTT ADAMS AND AARDVARK ADVENTURE GAMES!! (Disk or tape)

16K RAM CARTRIDGE $49.00

Increases VIC-20 programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are on outside cover! CARDCO Includes FREE $29.95 game!!

8K RAM CARTRIDGE $34.95

Increased VIC 20 programming power 2½ times Expands total memory to 33K (33,000 bytes). Includes FREE $16 95 game!

3 SLOT SWITCHABLE EXPANDER $24.95

Allows you to add 3 cartridges at one time—switch select to turn slots on or off—PLUS reset button A must for your VIC-20 computer!!

9" GREEN SCREEN MONITOR $69.00

Excellent quality SANYO, easy to read, 80 columns x 24 lines Green Phosphorous screen with anti-glare, metal cabinet! Saves your T V PLUS $9 95 for connecting cable Com-64 or VIC 20

12" GREEN OR AMBER MONITOR $99.00

Your choice of green or amber screen monitor top quality, SANYO 80 columns x 24 lines, easy to read, anti glare, faster scanning! PLUS $9.95 for connecting cable Com-64 or VIC 20

PHONE ORDERS
8AM - 8PM Weekdays
9AM - 12N Saturdays

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add $10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $20.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

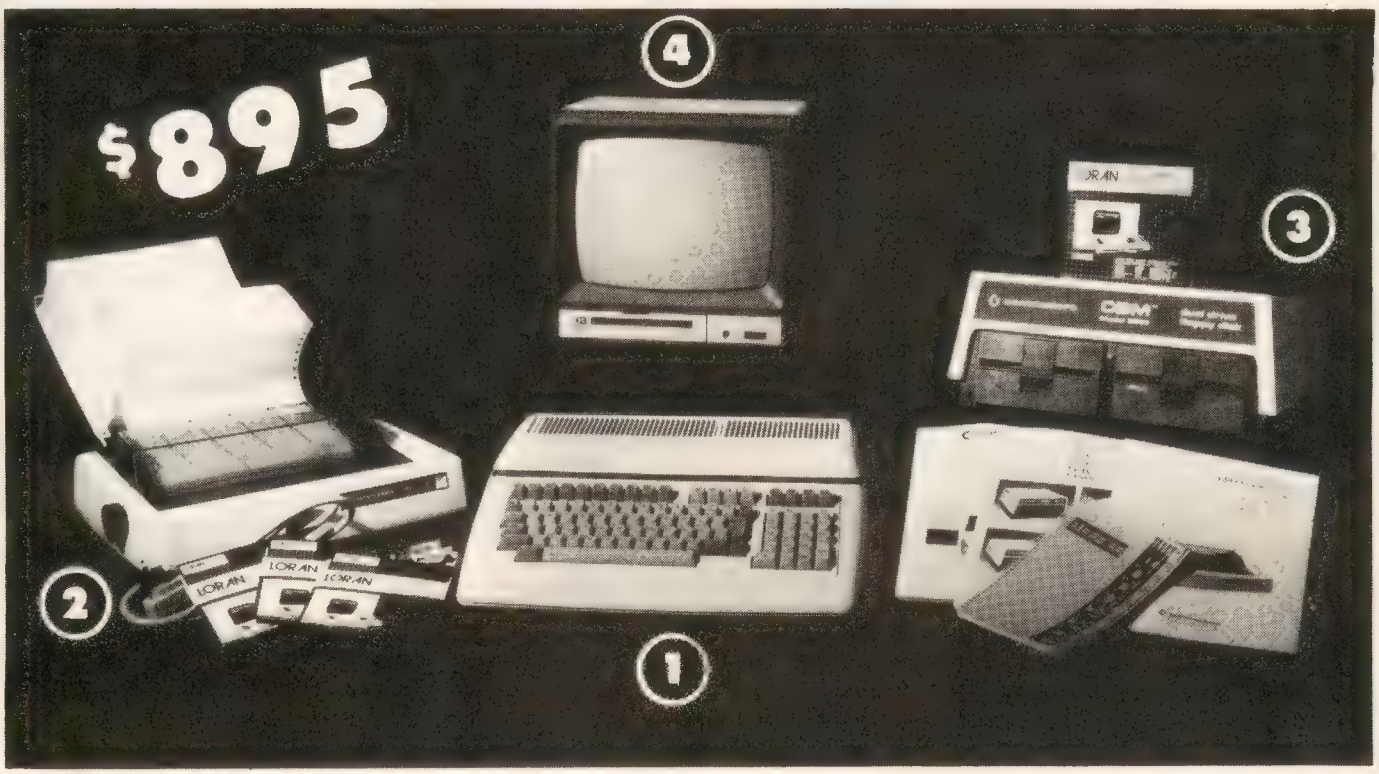
PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

NEW 128K —MEGA BYTE DUAL DISK DRIVE—80 COLUMN

COMPUTER SYSTEM SALE!

HOME • BUSINESS • WORD PROCESSING



LOOK AT ALL YOU GET FOR ONLY **$895.**

	LIST PRICE
① B128 COMMODORE 128K 80 COLUMN COMPUTER	$ 995.00
② 4023 - 100 CPS - 80 COLUMN BIDIRECTIONAL PRINTER	499.00
③ 8050 DUAL DISK DRIVE (over 1 million bytes)	1795.00
④ 12" HI RESOLUTION 80 COLUMN MONITOR	249.00
• BOX OF 10 LORAN LIFETIME GUARANTEED DISKS	49.95
• 1100 SHEETS FANFOLD PAPER	19.95
• ALL CABLES NEEDED FOR INTERFACING	102.05
TOTAL LIST PRICE	**$3717.95**

$895 SALE PRICE

PLUS YOU CAN ORDER THESE BUSINESS PROGRAMS AT SALE PRICES

	LIST	SALE
Professional 80 Column Word Processor	$149.95	**$99.00**
Professional Data Base	$149.95	**$99.00**
Accounts Receivable	$149.95	**$99.00**
Accounts Payable	$149.95	**$99.00**
Payroll	$149.95	**$99.00**
Inventory	$149.95	**$99.00**
General Ledger	$149.95	**$99.00**
Financial Spread Sheet	$149.95	**$99.00**

PRINTER REPLACEMENT OPTIONS

(replace the 4023 with the following at these sale prices)

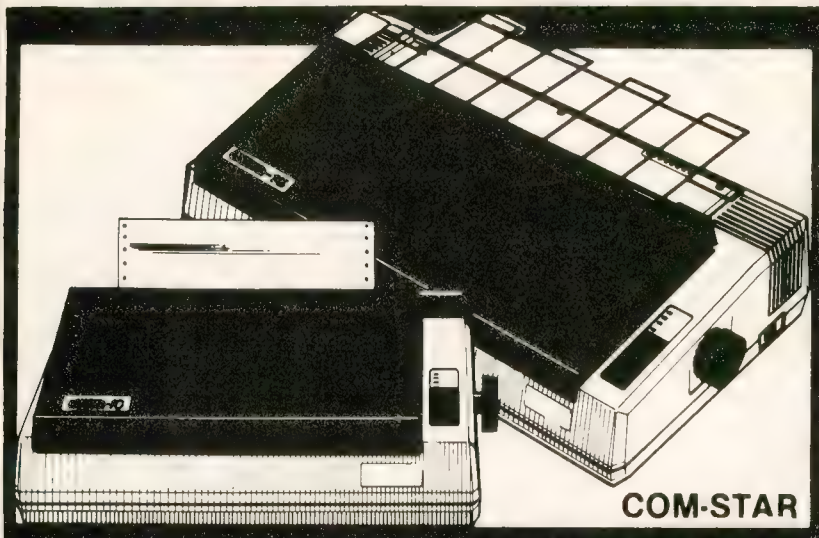
	LIST	SALE
Olympia Executive Letter Quality Serial Printer	$699.00	**$399.00**
Comstar Hi-Speed 160 CPS 15½" Serial Business Printer	$779.00	**$499.00**
Telecommunications Deluxe Modem Package	$199.00	**$139.00**

15 DAY FREE TRIAL. We give you 15 days to try out this SUPER SYSTEM PACKAGE!! If it doesn't meet your expectations, just send it back to us prepaid and we will refund your purchase price!!
90 DAY IMMEDIATE REPLACEMENT WARRANTY. If any of the SUPER SYSTEM PACKAGE equipment or programs fail due to faulty workmanship or material we will replace it IMMEDIATELY at no charge!!

Add $50.00 for shipping and handling!!
$100.00 for Alaska and Hawaii orders.
WE DO NOT EXPORT TO OTHER COUNTRIES
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail! We accept Visa and MasterCard. We ship C.O.D. to continental U.S. addresses only.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

FANTASTIC COMPUTER PRINTER SALE!!!



COM-STAR T/F

Tractor
Friction
Printer

only $ 169**

- Lowest Priced, Best Quality, Tractor-Friction Printers in the U.S.A.
- Fast 80-120-160 Characters Per Second • 40, 46, 66, 80, 96, 132 Characters Per Line Spacing
- Word Processing • Print Labels, Letters, Graphs and Tables • List Your Programs
- Print Out Data from Modem Services • "The Most Important Accessory for Your Computer"

** DELUXE COMSTAR T/F 80 CPS Printer — $169.00

This COMSTAR T/F (Tractor Friction) PRINTER is exceptionally versatile. It prints 8½" x 11" standard size single sheet stationary or continuous feed computer paper. Bi-directional, impact dot matrix, 80 CPS, 224 characters. (Centronics Parallel Interfact).

Premium Quality 120-140 CPS 10" COM-STAR PLUS+ Printer $249.00

The COM-STAR PLUS+ gives you all the features of the COMSTAR T/F PRINTER plus a 10" carriage, 120-140 CPS, 9 x 9 dot matrix with double strike capability for 18 x 18 dot matrix (near letter quality), high resolution bit image (120 x 144 dot matrix), underlining, back spacing, left and right margin settings, true lower decenders with super and subscripts, prints standard, italic, block graphics and special characters. It gives you print quality and features found on printers costing twice as much!! (Centronics Parallel Interface) (Better than Epson FX80). List $499.00 **SALE $249.00**

Premium Quality 120-140 CPS 15½" COM-STAR PLUS+ Business Printer $349.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER plus 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100). List $599

SALE $349.00

Superior Quality 140-160 CPS 10" COM-STAR PLUS+ IBM IBM Pers/Bus Printer $369.00

Has all the features of the 10" COM-STAR PLUS+ PRINTER! It is especially designed for all IBM personal computers! 140-160 CPS HIGH SPEED PRINTING 100% duty cycle, 2K buffer, diverse character fonts, special symbols and true decenders, vertical and horizontal tabs.

A RED HOT IBM personal business printer at an unbelieveable low price of $369.00 (centronics parallel interface)

List $699 **SALE $369.00**

Superior Quality 160-180 CPS 10" COM-STAR PLUS+ HS Business Printer $369.00

The **Super Com-Star+ High Speed Business Printer** 160-180 CPS has a 10" carriage with all the Com-Star+ features built in! The 15½" **High Speed Business Printer** is especially designed with more powerful electronics to handle larger ledger business forms! Exclusive bottom feed! (Centronics parallel interface)

15½" printer is also compatable with IBM Personal/Business Computers! 15½" Printer List $799.00 ***SALE* $469.00**

Olympia

Executive Letter Quality DAISY WHEEL PRINTER $379.00

This is the worlds finest daisy wheel printer **Fantastic Letter Quality,** up to 20 CPS bidirectional, will handle 14.4" forms width! Has a 256 character print buffer, special print enhancements, built in tractor-feed (Centronics Parallel and RS232C Interface) List $699 **SALE $379.**

• 15 Day Free Trial - 1 Year Immediate Replacement Warranty

PARALLEL INTERFACES

For VIC-20 and COM-64 — $49.00 For Apple computers — $79.00 Atari 850 Interface — $79.00 For ALL IBM Computers — $89.00

Add $14.50 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $29.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA—MASTER CARD—We Ship C.O.D. to U.S. Addresses Only

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COM-STAR PLUS+ Print Example: ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ 1234567890

Commodore - 64

WORD PROCESSING BREAKTHROUGH!

SCRIPT-64 EXECUTIVE WORD PROCESSOR

(80 Columns in Color)

40 or 80 columns in color or black and white; turns your computer into a Business Machine!

This is the finest word processor available. Features include line and paragraph insertion/deletion, indentation, right and left justification, titles, page numbering, characters per inch, etc. All features are easy to use and understand. With tabs, etc. SCRIPT-64 even includes a 250 word dictionary/spelling checker to make sure your spelling is correct. The dictionary is user customizable to any technical words you may use. Furthermore, all paragraphs can be printed in writing and everyday letters are a snap. To top things off, there is a 100 page manual and help screens to make learning how to use SCRIPT-64 a snap. This word processor is so complete we can't think of anything it doesn't have. When combined with the complete database you have a powerful mailmerge and label program that lets you customize any mailing list with personalized letters. List $99.95. **Sale $49.95**. *Coupon Price $39.00. (Disk only.)

SCRIPT-64 20,000 WORD DICTIONARY

Allows you to check spelling on 20,000 most often mispelled words! List $29.95 **Sale $19.95.** *Coupon Price $10.00. (Disk only.)

SCRIPT-64 COMPLETE DATABASE

(PLUS MAIL MERGE AND LABELS)

This powerful DATABASE is user friendly and makes any information easy to store and retrieve. The user defines the fields and then can add, change, delete, and search for any category wanted! When combined with the Executive Word Processor you can search out any category (zip codes, even hair color, etc.) and print super personalized letters! 600 names can be sorted and formulated on each disk in any order or category! Will handle any size mailing list by changing or adding disks! List $69.00. **Sale $34.00**. *Coupon Price $24.00.

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

WE SHIP C.O.D HONOR VISA AND MASTER CHARGE
ADD $3.00 SHIPPING FOR C.O.D. ADD $2.00 MORE
SPECIAL SERVICES:
One Day — Express Mail add $10.00

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMMODORE 64

Computer Learning Pad

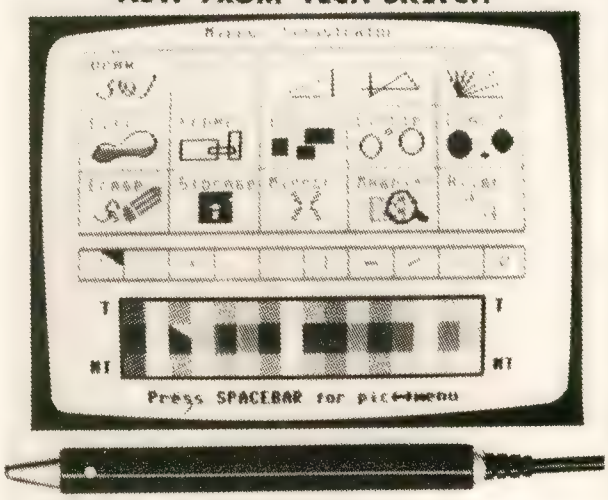
Sale! 39.95 List $79.95

- **Makes other graphic tablets Obsolete**
- **Includes Special Printer Feature.**

Now you get this **Fantastic Tech Sketch Computer Learning Pad Program** with a **Professional Light Pen** Free! (39.95 value) plus the **Micro Illustrated Graphics Pad Program** that allows you to draw on your T.V. or monitor screen (better than Gibsons $99 light pen). Whatever you can draw on the screen you can print on your printer (a Tech Sketch Exclusive.)

Hi-Resolution!

NEW FROM TECH SKETCH



JOIN THE "NEW BREED" OF VIDEO ARTISTS!

Commodore 64 & VIC-20

$24.95 Professional Model $24.95

Light Pens

Professional Light Pen. This is the TECH SKETCH Hi-Resolution model that allows you to draw fantastic pictures and professional diagrams — single-pixel accuracy! (Includes famous paint and sketch program.) List $39.95. **Sale $24.95.** *Coupon $22.95*

$24.95

Economy Model with 3 programs $16.95

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

COMMODORE-64 or VIC-20

VOICE SYNTHESIZER

NEW NEW

MAKE YOUR COMPUTER TALK

VOTRAX BASED HARDWARE

SALE ONLY **$59.00**

You can program any words or sentences • Adjust volume and pitch • Make adventure games that talk • Real sound action games • Make customized talkies • (Demo disk or tape included) • Requires Speaker

You can add **TEXT TO SPEECH SOFTWARE** that allows you to simply type what you want to hear!! Also allows you to add sound and voice to **SCOTT ADAMS AARDVARK** and **"ZORK" ADVENTURE GAMES** List $29.95 Sale $19.95 (Disk or Tape).

• LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
• BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

COMMODORE 64

80 COLUMN BOARD

SALE

FOR ONLY **$99.00**

Now you can program 80 columns on the screen at one time! Converts your Commodore 64 to 80 columns when you plug in the PROTECTO 80 Expansion Board. List $199.00. **Sale $99.00.**

Includes 4 Slot Expander and can be used with most existing software!!!

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail!
VISA — MASTER CARD — C.O.D.
No C.O.D. to Canada, APO-FPO.

WE LOVE OUR CUSTOMERS

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

FUJI SALE $1.49 ea.

Premium Quality Floppy Disks

Box of 10 *with hub rings, sleeves and labels*

Famous Brand FUJI Floppy Disks for those who care about keeping their data.

Single Sided — Double Density
for Commodore 64, Atari, Apple

List $39.95
Sale $16.95
Coupon $14.95

Double Sided — Double Density
for IBM

List $59.95
Sale $39.95

Floppy Disk Filer

Everyone Needs a Floppy Disk Secretary

Facts: (Holds 50 to 75 Disks)

$12.95

- Dust and Dirt particles can hurt your disks
- Most disks go bad due to mishandling in storage
- Proper filing of your disk collection will reduce unnecessary handling of your disks

The Floppy Disk Filer is an inexpensive hard plastic Fliptop case that will allow for easy filing, and protect your disks from dust, smoke, and dirt. Plus, the Floppy Disk Filer will keep all your disks out of unwanted hands and in one place where you can easily find them.

List $29.95

Introductory Sale Price $14.95
Coupon $12.95

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII ALASKA, APO-FPO orders. Canadian orders must be in U.S dollars WE DO NOT EXPORT TO OTHER COUNTRIES.
Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders. 1 day express mail!
VISA — MASTER CARD — C.O.D.
No C.O.D. to Canada, APO-FPO

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

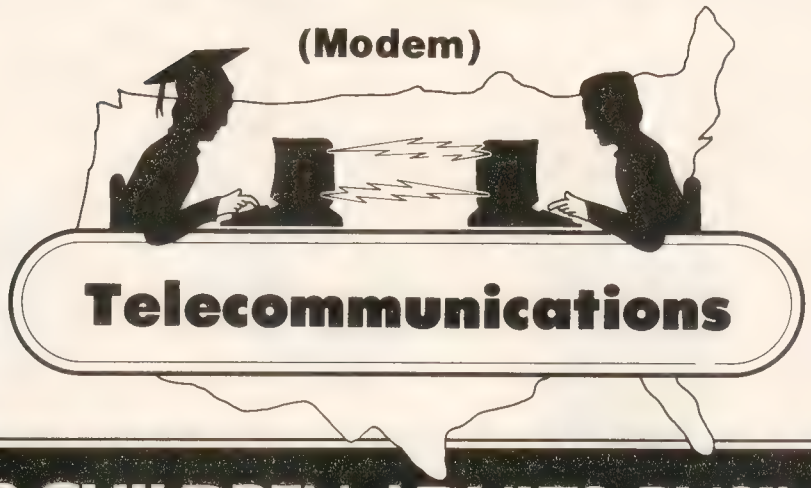
Commodore 64

(Modem)

Sale

Sale

$79



$79

FOR CHILDREN·ADULTS·BUSINESS

Complete Auto Dial Telecommunications Package

"The only telecommunications package you will ever need."

NEW

Total Telecommunications

NEW

• 300 Baud Modem • Auto Dial • Auto Answer • Upload & Download

• Membership in 52 Database Services (UPI News, Dow Jones, etc.)

Reach Out and Access Someone

- Educational courses
- Financial Information
- Banking at Home
- Popular Games
- News Updates and Information
- Electronic Shopping
- Research and Reference Materials

The Total Telecommonications Package offers you all this plus ...

- Auto Log-on
- Dialing from Keyboard
- On-line Clock
- Capture and Display High Resolution Characters
- Download Text, Program or Data Files
- Stores on Disk Downloaded Files
- Reads Files from Disk and Uploads Text or Program Files
- Select Any Protocol (access almost any computer or modem)
- Plus Much, Much More

List $129.95 **Special Low Christmas Price** **$79.00**

We are so sure this is the only telecommunications package you will need we will give you 15 days Free Trial.

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

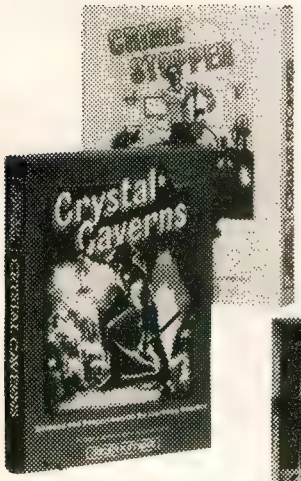
PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

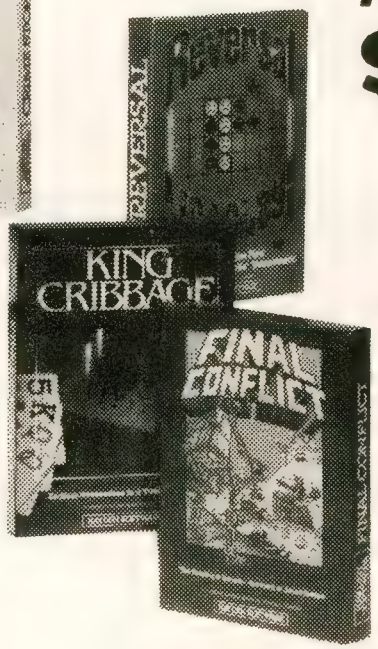
BOX 550, BARRINGTON, ILLINOIS 60010

Phone 312/382-5244 to order

Hayden's Computer Software Price Breakthrough

Commodore 64





Your Choice

$9.95

Originally $24.95 to $34.95

Text Adventure

Crime Stopper:
Assume the role of a private eye to save a kidnapped heiress.

Crystal Caverns:
Find hidden buried treasures under an old mansion.

Strategy Games

Final Conflict:
Program robots to destroy enemy's base. Battlefield variations game can be played against computer or opponent.

King Cribbage:
Graphic version of the classic card game. Hi-res graphic representation of playing cards and cribbage board.

Reversal:
Winner of the national "Othello" tournament.

Championship Golf:
Select club, strike, direction; a must for every golfer.

Education

MicroAddition
MicroSubtraction
MicroMultiplication
MicroDivision
Color animation and cheerful tunes make learning arithmetic fun.

Match-Up:
3 matching games for pre-school that use colorful objects that teach the principles of "same," "related," and "different."

Don't Shoot That Word:
Your beginning readers will become skilled at word recognition with this fun game.

Other Great Values From Hayden

Sargon II:
The best selling microcomputer chess game in the world. A classic game with seven levels of play.

was $34.95
now **$17.95**

Word Challenge:
An engaging word game like Boggle, 90,000 word lexicon, dozens of game variations.

was $39.95
now **$29.95**

SAT Sample Tests:
It includes a diagnostic Pre-test for determining strengths and weaknesses in the mathematical and verbal section of the SAT. Offers test-taking strategies and two timed simulated SAT exams scored on the "800" scale.

was $34.95
now **$17.95**

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO ENTERPRIZES WE LOVE OUR CUSTOMERS!

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

SUPER SALE!!!

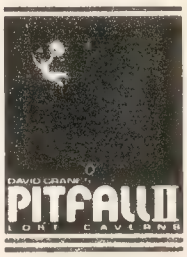
ACTIVISION

GREAT SAVINGS!!!

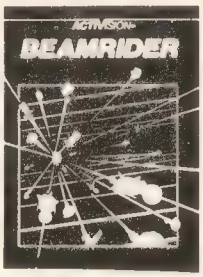
Fantastic Graphic Arcade Action Games For Your Commodore-64

River Raid — Voted Best Action game by Electronic Games Magazine. Now you can play the extended version of the all time great home video game. Over 5000 enemy targets and fantastic action and sound will keep you busy for days. (Highly Recommended) List $39.95. **Sale $27.95**. (Disk)

Pitfall II - Lost Caverns — The feats of Pitfall Harry continue with the full advantages of the Commodore-64. The caverns are 27 levels deep and you must make Harry swim through rivers, float through the air on balloons, even freefall with perfect timing. Fantastic sound, graphics, and action. (Very Highly Recommended) List $39.95. **Sale $27.95**. (Disk)



Beamrider — (Better than Tempest) Move and fire along the grid as aliens attempt to destroy you. Super fast joystick action is the only thing that will keep you alive to make it to the next grid (99 grids) where more challenges await you. Super Action and Graphics. List $39.95. **Sale $27.95**. (Disk)



Decathalon — Finally an Olympic Event for two players at the same time (or play against the computer) Run, Hurl, Vault, Jump and more (10 events in all). Fantastic graphics and sound will keep you playing this one for days on end. Great Competition. List $39.95. **Sale $27.95**. (Disk)

Toy Bizarre — The toy factory has gone crazy. Toys spring to life and try to destroy you and the factory. Jump from level to level and close the valves, and capture the toys before the toys do you and the factory in. Fantastic Graphics and Sound. List $39.95. **Sale $27.95**. (Disk)

H.E.R.O. — Descend through the caverns with your dynamite and laser helmet; clear the tunnels to rescue the trapped miners; watchout for molten lava, animals, insects, etc. If you hit the lights they go out and you're in the dark. Fantastic Graphics and Sound combine with a superb theme to make this a best game for the year. List $39.95. **Sale $27.95**. (Disk)

Zenji — Find your way through the paths. Easy? The paths constantly change as the squares slide around. Use your senses to decide which way is out. If your senses fail, you are trapped and dead! Fantastic action. List $39.95. **Sale $27.95**. (Disk)

Zone Ranger — Better than Asteroids and Omega Race. You must pilot your starship first through asteroid alien territory and dock at your base, then you must make your way through the mazes past hostile aliens. Constantly 4-way scrolling screens make this a must for all game players. Fantastic Graphics and Action. List $39.95. **Sale $27.95**. (Disk)

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery. 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010

Phone 312/382-5244 to order

Commodore 64

NEW!

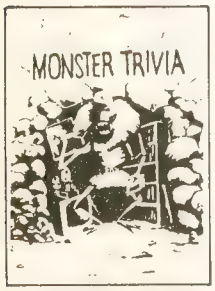
$12.95 AND UP

ARCADE ACTION VIDEO GAMES
Cassette $12.95
Diskette $16.95

GAMES WORTH PLAYING COSMI

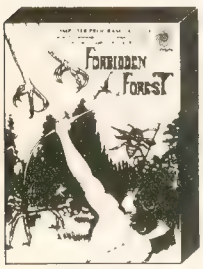
Text Pro/Data Pro

Two hot selling home/office management systems in one package. Includes both a powerful word processor and a database storage program. Available in both cassette and disk.
List $34.95. **Sale $24.95**.



Monster Trivia

A hot new concept for home and computer buffs. Over 2000 trivia questions in six categories for one to four players. With exciting high resolution graphics, colors and sounds. Available in both cassette and disk.
List $24.95. **Sale $16.95**.

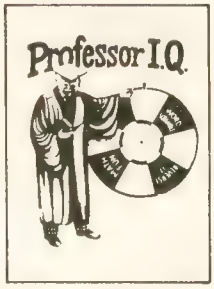


Forbidden Forrest.

Only your skill as an archer can protect you! Giant spiders, enormous bumblebees, huge leaping frogs, a phantom protected by killer skeletons, and even a fire breathing dragon try to stop you. All in stunning 3-D graphics. You'll feel like you're part of this one. Fantastic all the way around. (Tape.) List $16.95. **Sale $12.95**. (Disk.) List $21.95. **Sale $16.95**.

Professor I.Q.

This educational game is designed in an exciting, fun filled format, automatic handicapping challenge includes Word Scrambles, Math Fun, Puzzle Time, Reverse It and Strategy. Available on cassette and disk for one or two players. (Tape.) List $16.95. **Sale $12.95**. (Disk.) List $21.95. Sale $16.95.

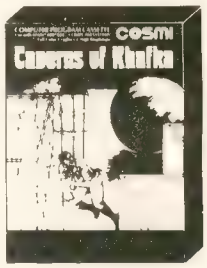


Aztec Challenge.

You are a member of the powerful Aztec tribe. To avoid sacrificing yourself to the gods, you must compete in and complete the deadly AZTEC-OBSTACLE-COURSE. Seven phases with increasing levels of difficulty make this course challenging and keep you going for hours.
List $16.95. **Sale $12.95**. (Tape or Disk).

Caverns of Khafka.

Unbelievable adventure game. Here's just a few of the many obstacles: Boulder of Isis, Mazes of Khafka, Keys of the Chambers, acid pools, falling boulders, ladders, jumping ropes, moving walls and platforms and a whole lot more. Fantastic graphics and sound make this a must for everyone. (Tape.) List $16.95. **Sale $12.95**. (Disk.) List $21.95. **Sale $16.95**.



COSMI COSMI COSMI

ARCADE QUALITY NEW! ARCADE QUALITY NEW! ARCADE QUALITY NEW!

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO ENTERPRIZES (WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

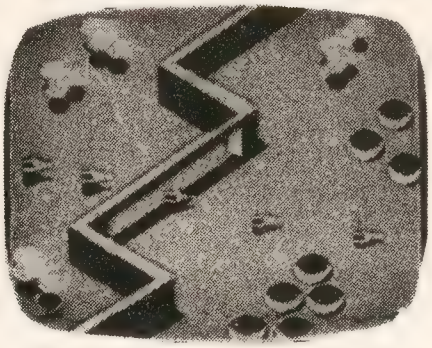
Commodore-64 Software

Super Sale!! Save On

Access Software

Best Multi Level Graphics Games in the U.S.A.

RAID OVER MOSCOW

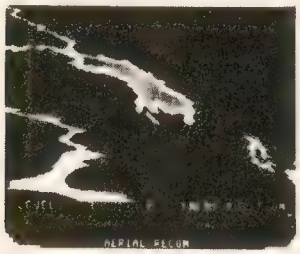


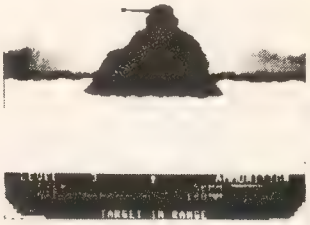
Raid over Moscow — The ultimate in multi screen computer graphics has arrived. (over six screens) The Soviets have launched an attack. First you must locate and destroy the ICBM missiles from your Stealth Bomber, then you must lead your squadron through the Soviet terrain to the Kremlin itself. Destroy the defenses, then destroy the defense center and finally the attack operations themselves. Fly planes, launch grenades, shoot bazookas. Super Fantastic Graphics, Sound, Animation. **(The best multi-level game we've seen!!!)** List $39.95. **Sale $29.95.** (Disk.) *Coupon $26.95.*

BEACH HEAD

Beach Head — Multi Screen computer graphics at its finest. First you must maneuver your fleet through the mine laden channel while torpedoes are fired at you from all sides. Next you must engage the enemy planes with your anti-aircraft guns (best scenario graphics anywhere). Then you must sink the enemy fleet before they sink you. Next you maneuver to the beach head where your tanks must get through an obstacle course and finally fight the ultimate battle at Headquarters. All scenes in stunning 3-D graphics. (Will be the best graphics of 1984, definitely).

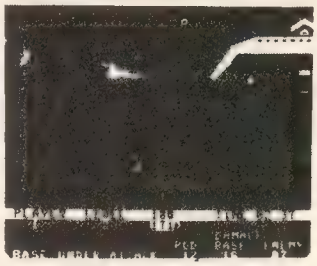
List $39.95. **Sale $24.95.**
Disk or Tape.





Actual Screens ***Actual Screens***

NEUTRAL ZONE



Neutral Zone — Reach the outer edges of the galaxy. You must protect your spaceship from attacking enemy space ships while defending yourself from enemy missiles. Fantastic 360 degree 3-D High Resolution Graphics. Rated No. 1 for graphics in 1983. List $34.95. **Sale $24.95.**(Tape or disk).

Add $3.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add $6.00 for CANADA, PUERTO RICO, HAWAII, ALASKA, APO-FPO orders. Canadian orders must be in U.S. dollars. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!

VISA — MASTER CARD — C.O.D.

No C.O.D. to Canada, APO-FPO.

PROTECTO
ENTERPRIZES (WE LOVE OUR CUSTOMERS)
BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

then put a zero into the Y register. The Y register is like the Accumulator, but it is usually used the way FOR I = 1 TO 200 would be in BASIC—it counts events and can also act as an offset for storage. Notice line 834. We are storing the 5 in the Accumulator at address 37888 (the start of color memory). However, since we have attached the Y to the end of this number, it means that we are using another special addressing mode. This mode will store what's in the Accumulator into the number given (37888 in this example) *plus* whatever number is in the Y register. At this point, zero is in the Y register, so a 5 is POKEd into address 37888 + 0. This is how Y can be used as an offset.

Likewise, we also POKE the 5 into 38144 which is halfway up the color memory. In effect, we are going to fill color memory in two chunks, two stages. That's because the Y register can only count up as high as 255 and then it resets itself to zero. To fill an area like the color memory, which is larger than 256 bytes, we need to store twice, with the second storage address being 256 bytes higher than the first (see lines 834 and 837).

How Registers Reset Themselves

At this point, the Y register is decremented with the DEY command. It's the same as saying, in BASIC, Y = Y − 1, except that in ML a register cannot go below zero. Instead, it clicks down to 255 when you take it below zero. If you lower it through zero, it looks like this: 4,3,2,1,0,255,254, etc. (This also happens at the other end. If you add 1 to the Y register when it is holding 255, it will become a zero: 254,255,0,1,2, etc. The fact that the registers reset themselves like this is very useful in ML programming.)

In any case, we lower the Y register with the DEY command and then test to see if it has become a zero yet. BNE means Branch if Not Equal to zero. The first time through this loop, Y was pulled down from 0 to 255 so the computer is forced to branch back to line 834. 255 is not zero. This time around, the POKEs will go into different addresses within color memory than they did the first time. Now Y (added to the 37888 or 38144) will produce a different target address for the POKE. By continuing through this loop until Y has been decremented to zero, we manage to fill the entire color memory with the number 5.

After going through the loop 256 times in this way, Y has finally counted down to zero and so we won't, for once, be forced to branch from line 841. Instead, we fall through to line 843 which puts a 0 into the X register, which acts much like the Y register. In the next loop, we're going to use the X register as an offset.

Making An Endless Loop

Now that color memory is set up, we create a second loop which is functionally identical to the first except that this time our purpose is to move sections of the computer's memory to the screen. We're going to send the 256 bytes which start at address 0 and another 256 bytes which start at address 512. This time we'll use a +X addressing mode to load the Accumulator as well as store the Accumulator (LDA and STA). Rather than use a branch instruction, however, this time we end the loop with a jump (JMP) which will always send us back up to the start of the loop. This endless loop will continually display memory on screen until you press RUN/STOP and RESTORE.

Using The Assembler

When you are using this assembler (Program 1) you should follow the addressing mode conventions which appear on screen whenever you run it (see lines 150–185). In a nutshell, you use no commas or $ symbols. Not only is this easier to type, but also it allows the assembler to use a simple INPUT statement to receive your program lines. Many 6502 assemblers require that you separate numbers from symbols with a comma, as in: STA 37888,Y. They also require that you use hexadecimal numbers which are preceded by the $ symbol. If you should want to use hexadecimal with this assembler, just change line 10 so that H = 1. If you don't know what hexadecimal is, it's just as well. That's a subject for a future lesson. You can program in ML without it anyway.

The disassembly examples above show the format for entering ML commands into the assembler. To make all this clear, let's type in and run the example ML program.

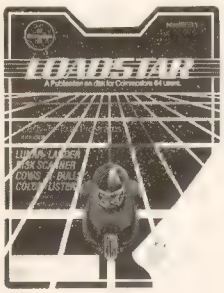
1. Load the assembler program (Program 1) and make sure line 10 says H = 0 because we'll be typing in ordinary decimal numbers, just as they appear in the disassembly listing.

2. Run the assembler. After reminding you of its addressing conventions, it will ask you for the starting address. Answer 830 and press RETURN. That's the address where the ML program will be assembled in your computer's RAM memory. It's in the cassette buffer and will be safe there during assembly. When we've finished, you can type SYS 830 and see the results of our efforts.

3. Now, if your assembler is working correctly, it will clear the screen and list the 830 address with a question mark. It's waiting for your first ML instruction. If you have a VIC, type in the first instruction in the VIC disassembly listing. (If you use a 64, type in the instructions

LOADSTAR

A monthly disk publication for Commodore 64



In this issue!

LUNAR LANDER
Have you got the "right stuff" to be an astronaut?

HOPPER
Bet you can't leave just one (peg, that is...)

COWS & BULLS
Not an agricultural program; it helps to be a MASTERMIND.

COLOR LISTER
Puts an end to monochrome listings.

DISK SCANNER

SECTOR CORRECTOR

FILE SCANNER
These three useful programs let you save the day when your diskette goes bad.

FRENCH MILITARY GAME
A "board" strategy game (the 64 gets smarter as you play).

SLOT MACHINE
Everyone hates bandits (even if they have only one arm).

BAM MAP 64
Answers Shakespeare's question: What is used and what is not?

BINARY SAVE
For those that want to save "RAW" memory to disk.

DECISION MAKER
This will help, but you still must take responsibility for your actions.

BLIP IS THE BLAP OF BLEEP
A random aphorism generator.

HOW SMART ARE YOU?
This program will not answer the question.

As if all these programs weren't enough...

This issue of LOADSTAR also contains graphics, music, programming hints & tips, plus subscriber bulletins and reviews.

LOADSTAR comes on a double-sided diskette. LOADSTAR is a bonanza of unprotected programs.

LEARN - programming techniques
USE - useful programs
ENJOY - games and novelties
SHARE - experiences with other Commodore-64 owners

send to: LOADSTAR
P.O. Box 30007
Shreveport, LA 71130-0007
(318)868-7247

Enclosed is $9.95 for number 1 as shown above.

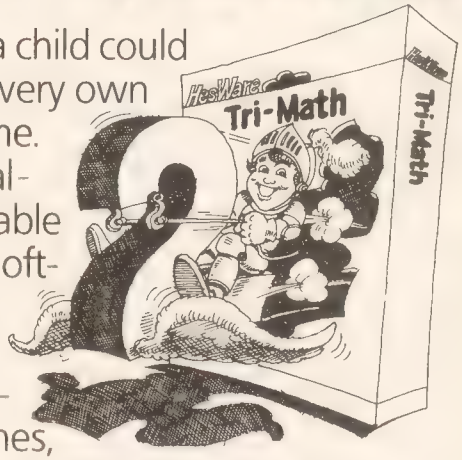
NAME _____

ADDRESS _____

CITY/STATE _____ ZIP _____

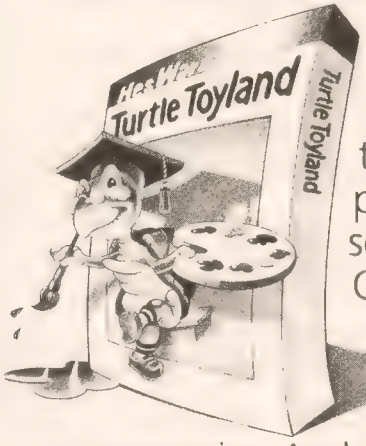
VISA/MASTERCARD# _____ EXP _____

GIVE YOUR CHILDREN AN EDUCATION THEY'LL NEVER GET IN SCHOOL.

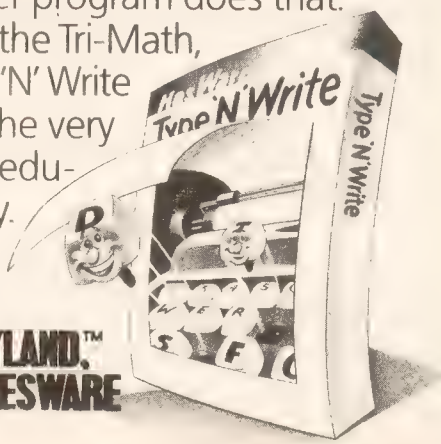


Just think how much a child could learn if they had their very own private teacher at home.

That kind of specialized help is now available through educational software programs from HesWare. There's Tri-Math, for the Commodore 64, that uses games, and loveable characters to teach your 6-12 year olds how to figure out math.



Then there's Turtle Toyland. It introduces your children to the wonderful world of computer graphics, animation, and sound. Kids can develop ideas. Create and animate characters. Even write music for their very own "Videotoons" by using the elements of Turtle programming. And of course there's Type 'N' Write. A program that teaches children the keyboard and touch typing. And it even includes a real working word processor. No other program does that.



So get your children the Tri-Math, Turtle Toyland, and Type 'N' Write educational programs. The very programs acclaimed by educators across the country. It will be a real learning experience for all ages.

TRI-MATH,™ TURTLE TOYLAND,™ AND TYPE 'N' WRITE™ BY HESWARE

For the Commodore 64

from the 64 disassembly instead. Otherwise, follow the same process.) Type: LDA #5 and press RETURN. The assembler will pause briefly and then store two numbers (169 and 5) into memory as well as displaying them on screen. (169 is the computer's code for LDA # and 5 is, of course, 5. The purpose of an assembler is to take the commands like LDA which are easy for us to remember and turn them into numbers like 169 which the computer can obey. It's something like the way BASIC tokenizes the word PRINT into the number 153.)

Seeing Your Computer's Clock

After you press RETURN, the assembler will print the next available address and await your next input. Now you would type LDY #0 and press RETURN. Continue on down, typing in all the lines until you've finished with JMP 845. After that line is entered, type END and the assembler will return you to BASIC mode and report where your ML starts and ends in memory.

At this point, you have created a tiny, but complete, ML program which is waiting for you to test it. Just SYS 830 and you should see a screenful of odd characters. We've opened a window to the first 256 bytes in RAM as well as the BASIC keyboard buffer. The character which seems to be constantly rotating is your internal clock. And if you type on the keyboard, you can see it coming into the keyboard buffer (up to a maximum of ten entries). To exit the program, press RUN/STOP and RESTORE. For a different view, type ?CHR$(14) to set lowercase mode and SYS 830 again. Try holding down the SHIFT, Commodore, and function keys to see the effects. Since there is more room on the 64 screen, we have opened two extra windows, to show the video and interface chips, in the bottom half of the 64 screen.

Now, break out of the ML program again with RUN/STOP–RESTORE and type LIST. There's the assembler program, still in memory, unaffected by all the excitement. Let's assume you want a different color. Just type RUN. When the assembler fires up, give it 830 as your starting address again and then enter:

```
LDA #8
```

and press RETURN. Now type END to stop assembling. You have just caused the assembler to POKE over the previous LDA #5. The rest of the ML program remains the same. Try it. SYS 830 to see the effect.

Some Experiments To Try

If you want to observe different parts of your computer's memory, fiddle with the addresses given in lines 845 and 851 of the disassembly (lines 851, 856, 862, and 868 in the 64 version). What would happen if you had the contents of the screen sent *to* the screen? How about sending things from an address just slightly above or below the start of screen memory? What if you put different numbers into the Y registers with LDY? You can make any adjustments you like by just giving the assembler the starting address of where you want to write over something and typing END when you're finished.

Programs 2 and 3 are ordinary BASIC. They contain, in DATA statements, the VIC and 64 versions of this same program. If you have problems assembling, you could just type the loaders in, run, and then SYS 830 to see the same effects. Remember that the assembler changed our LDA #5 into 169 5 which it then POKEd into RAM memory? Notice the first two numbers in the DATA statements of Program 2. This should clarify how BASIC loader programs can create ML programs. A BASIC loader just holds a prewritten, freeze-dried ML program in DATA which it then POKEs into some spare RAM memory. There is no particular advantage to a BASIC loader except that on the VIC and 64, you can more easily save and load such programs to or from tape or disk.

See program listing on page 197.

SUPER FORTH 64

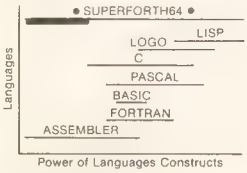
TOTAL CONTROL OVER YOUR COMMODORE-64™
USING ONLY *WORDS*
MAKING PROGRAMMING FAST, FUN AND EASY!

MORE THAN JUST A LANGUAGE...
A complete, fully-integrated program development system.
Home Use, Fast Games, Graphics, Data Acquisition, Business
Real Time Process Control, Communications, Robotics, Scientific, Artificial Intelligence

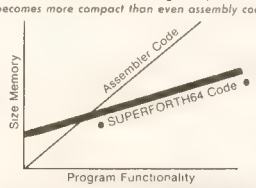
A Powerful Superset of MVPFORTH/FORTH 79 + Ext. for the beginner or professional

- 20 to 600 x faster than Basic
- 1/4 x the programming time
- Easy full control of all sound, hi res. graphics, color, sprite, plotting line & circle
- Controllable SPLIT-SCREEN Display
- Includes interactive interpreter & compiler
- Forth virtual memory
- Full cursor Screen Editor
- Provision for application program distribution without licensing
- FORTH equivalent Kernal Routines
- Conditional Macro Assembler
- Meets all Forth 79 standards+
- Source screens provided
- Compatible with the book "Starting Forth" by Leo Brodie
- Access to all I/O ports RS232, IEEE, including memory & interrupts
- ROMABLE code generator
- MUSIC-EDITOR
- SPRITE-EDITOR
- Access all C-64 peripherals including 4040 drive
- Single disk drive backup utility
- Disk & Cassette based. Disk included
- Full disk usage—680 Sectors
- Supports all Commodore file types and Forth Virtual disk
- Access to 20K RAM underneath ROM areas
- Vectored kernal words
- TRACE facility
- DECOMPILER facility
- Full String Handling
- ASCII error messages
- FLOATING POINT MATH SIN/COS & SQRT
- Conversational user defined Commands
- Tutorial examples provided, in extensive manual
- INTERRUPT routines provide easy control of hardware timers, alarms and devices
- USER Support

SUPER FORTH 64® *is more powerful than most other computer languages!*



SUPER FORTH 64® *compiled code becomes more compact than even assembly code!*



A SUPERIOR PRODUCT in every way! At a low price of only **$96**

Call: (415) 651-3160

PARSEC RESEARCH
Drawer 1776, Fremont, CA 94538

Take this ad to your local dealer
Phone orders also accepted. Immediate delivery! Dealer inquiries invited
CA residents must include tax

MasterCard VISA or C.O.D.

® PARSEC RESEARCH Established 1976 Commodore 64 & VIC-20 TM of Commodore

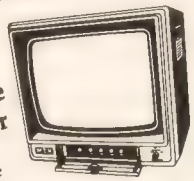
COMPUTER TV!! NEW!

MTR
8401
Color TV Tuner

- To turn any composite monitor to TV.
- Both computer/TV Switchable
- UHF/VHF
- FCC approved. (TV antenna not included)

$85.85

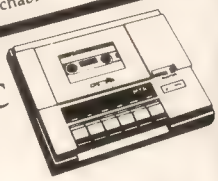
MTR
EV-2114
14" Composite Color Monitor



- Compatible with Commodore • Apple • Atari • T.I.
- NTSC Composite
- FCC Approved • UL STD.
- Front Mounted Controllers For Easy Adjustment
- Built-In Speaker
- Green Screen Switchable

~~$229.95~~
$215.85

MTR
PM-4401C
Data Sette Recorder



- Compatible with VIC-20 & Commodore 64
- Auto Stop
- Tape Counter
- Save LED
- Pre-Set Playback Level

$39.95

Monitor Cable — Plug 5 Pin Din to 4 RCA plugs includes 3.5 mm adaptor 3 ft **$7.95**

6' Cable — Computer to Printer or Disk Drive connects Commodore VIC 20 or C64 to Commodore Printer or Disk Drive 6 Pin Din to 6 Pin Din Ideal if your space requires a longer cable **$9.95**

Dust Cover — Commodore 64 Computer cloth backed vinyl highly anti-static media protects unit from spills, scratches, dust & static **$3.95**

Disk Drive Dust Cover — for 1540 or 1541 **$3.95**

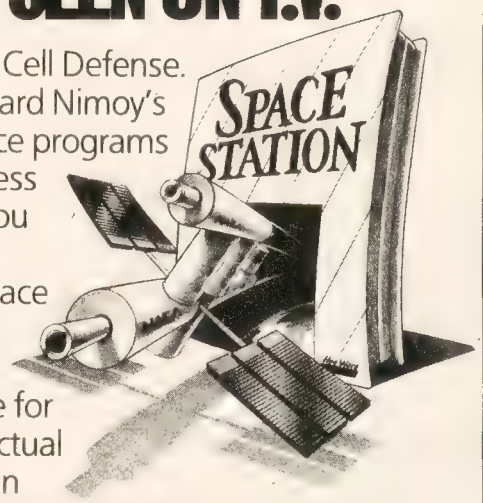
E MART, INC.
900 "N" Avenue, P.O. Box 454
Plano, Tx 75074

TO ORDER CALL:
outside Texas **1-800-631-1112**
in Texas **1-214-423-4199**
Please note change of our "800" number.

OFFICE: Mon-Fri: 9:00-12:00 PM/1:00-5:00 PM
Sat: 9:00-1:00 PM Central Time

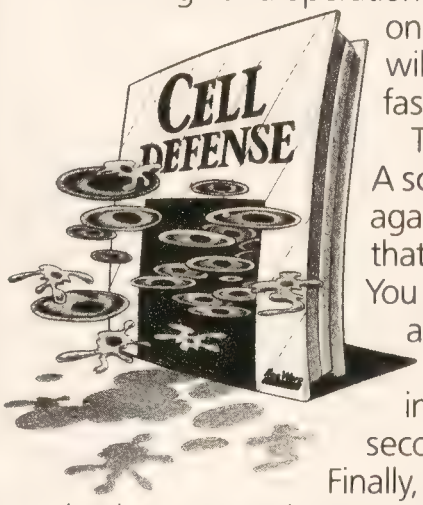
DELIVERY: For fast delivery, cashier checks, money orders or direct bank wires. Personal and company checks allow 3 weeks to clear. VISA/MC credit card add 3%. All prices are FOB net our Plano warehouse and subject to change without notice. Texas residents add 6% sales tax. All products with maker's warranty. All returns must be accompanied by return authorization number. Call (214) 423-4199 before returning goods for replacement. Any goods returned for credit are subject to 10% restocking charge plus shipping cost

WHY LEONARD NIMOY'S NEWEST SCIENCE SERIES WILL NEVER BE SEEN ON T.V.



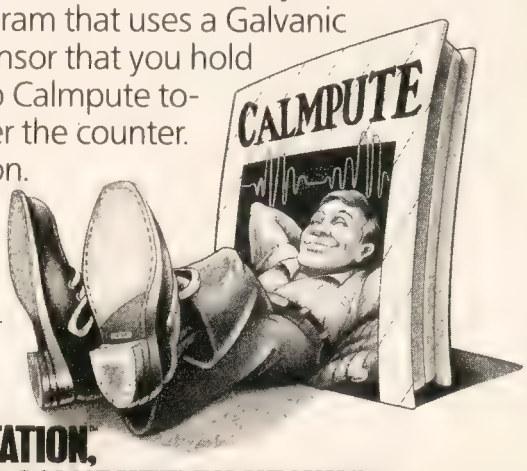
Project Space Station. Cell Defense. And Calmpute are Leonard Nimoy's favorite computer science programs from HesWare. And unless you have a computer, you may never see them.

First there's Project Space Station. A program that will put you and your children into deep space for days. It's based on the actual procedures NASA uses in the design and operation of a real space station. Not only will it expand your mind, it will challenge, stimulate, and fascinate you for hours.



Then there's Cell Defense. A science program that pits you against a host of deadly viruses that invade your bloodstream. You must use scientific strategies and basic concepts in biology to protect the cells from invaders. Or in a matter of seconds you'll be dead.

Finally, there's Calmpute. A biofeedback program that accurately monitors your level of stress. And suggests proper exercises to reduce tension. Or increase it, if need be. It's the only medical award winning program that uses a Galvanic Skin Response biosensor that you hold in your hand. Pick up Calmpute today. It's available over the counter. Without a prescription.



HesWare Science Series. They may never be seen on television but the experts give them extremely high ratings.

PROJECT SPACE STATION™, CELL DEFENSE™, AND CALMPUTE™ BY HESWARE

Apple II Family and Commodore 64 computers

SIMPLE ANSWERS TO COMMON QUESTIONS

Tom R. Halfhill
Staff Editor

QA

Each month, COMPUTE!'s GAZETTE *will tackle some questions commonly asked by new Commodore 64/VIC-20 users and by people shopping for their first home computer.*

If you have a question you'd like to see answered here, send it to this column, c/o COMPUTE!'s GAZETTE, *P. O. Box 5406, Greensboro, NC 27403.*

Q. ***I've had some trouble getting my new modem to work with my computer. Sometimes the phone link disconnects for no reason, and other times everything I send or receive comes across as garbage. What's going on?***

A. Modems can be very finicky devices. Some people are lucky enough to get them working right away, while others struggle endlessly with all kinds of mysterious problems. We'll discuss some of the difficulties we've encountered in our own experience and suggest some possible solutions.

To begin with, make sure the modem, telephone line, and computer are all hooked up properly. Even if you're positive everything is correct, review the instructions and check again. One time we spent ten minutes trying to figure out why a modem wouldn't generate a carrier tone, only to discover that its power cord was plugged into a wall socket controlled by a light switch—and the switch was turned off. Another time we got a carrier tone, but couldn't understand why a file refused to upload—the sending modem wasn't plugged into the computer interface. You'd be surprised how many telecommunications troubles can be traced to such simple mistakes.

Another thing to watch for is whether you are *originating* or *answering*. If you own a Commodore modem, there should be a switch on the side labeled O/A. If you're calling a commercial bulletin board, you're originating the call and the switch should be set to O. If you're calling a friend, one of you will be originating, the other answering.

Be certain the terminal program you're using is compatible with the modem. Then be sure you've adjusted the program correctly for the computer and modem at the *other end* of the phone line. Some computers require different parameters for parity, stop bits, word length, and so on. Any good terminal program lets you adjust the most important of these parameters. Be prepared to experiment for awhile to find just the right combination. If possible, find someone else with a similar setup who's already communicating with the remote computer and find out what settings they use.

If your program is adjusted properly and you're still sending or receiving garbage characters, it probably means there is "noise" on the line. Noise can be caused by anything from poorly fitting cables to the static of a weak long-distance telephone connection. Keep extension cables between the telephone socket, modem, and computer as short as possible. Keep the phone cables away from power transformers, color TV sets and monitors, and other devices emitting strong magnetic fields. If you hear static on the phone line when you hold a receiver to your ear, the connection may be too poor for reliable telecommunications.

If you're using an acoustic modem instead of a direct-connect, use a phone with a standard handset that fits tightly inside the rubber cups. Don't make any loud noises near an acoustic modem. Remember, modems transmit information over phone lines by sending audible tones. If either modem "hears" any extraneous sounds, it might interpret them as tones and attempt to translate them into characters. One time we were puzzled by occasional garbage characters in a file we were downloading from a distant computer. When we turned off the music playing in the same room, the garbage disappeared.

Sometimes noise originates in the phone lines. If you've positively eliminated every other

NRI gives you ALL the training you'll need to repair ALL microcomputers.

IBM is a Registered Trademark of International Business Machine Corporation.
Epson is a Registered Trademark of Epson America, Inc.
Apple and the Apple logo are Registered Trademarks of Apple Computer, Inc.
Compaq is a Registered Trademark of COMPAQ Computer Corporation.
1984 AT&T Technologies, Inc.

When you've learned the basics the NRI way, you can troubleshoot the entire system—and earn good money doing it!

For business owners, lost computer time means lost money. For customers, it usually means frustration, delay and a strong temptation to take a walk to the nearest competitor.

But for the NRI-trained computer service technician, a down computer can mean higher earnings or even the opportunity to start a profitable business.

Fixing computers: fastest growing occupation in the U.S.

Whether the flaw is in a circuit board, a disk drive or a printer, *everybody* wants it fixed—fast.

The U.S. Department of Labor recently projected that the number of computer service jobs wil *double* before 1995. Median earnings of full-time computer service technicians are $430 per week.

The trained computer technician can choose between: working for a large corporation or an independent; making office calls or staying in the shop; working for a retailer or for a specialized service firm—even starting his own computer repair business.

Total System Training from NRI.

As an NRI graduate, you'll be qualified to fix just about everything that can go wrong, for any major brand of desktop microcomputer. Only a person who knows and fully understands all the underlying fundamentals of microcomputers can hope to be able to tackle all microcomputers. NRI has known the need for thoroughly understanding fundamentals since 1914.

NRI's training is hands-on training. You get practical experience in writing programs in BASIC, testing and debugging systems. You'll learn how to install an expansion board, how to troubleshoot pesky circuit flaws. Using NRI's exclusive Discovery Lab®, you'll perform over 60 experiments. You'll learn how to fix the disk drives and printers.

You learn at your convenience, at your own most comfortable pace. Without classroom pressures, without rigid night-school schedules, without wasted gasoline. Your personal NRI instructor and the NRI staff will answer your questions, give you guidance—even give special help if you need it.

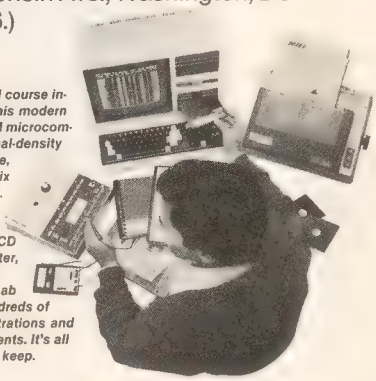
Computer, disk drive and printer—all yours to keep

As part of your training, you work with a TRS-80 Model 4, a powerful microcomputer with many of the features and capabilities of machines costing three times as much.

You'll install a double-density disk drive and a dot-matrix printer. And the entire system—computer, drive, printer and manuals—is yours to keep, as part of your training.

100-page FREE Catalog Tells More

Send the coupon today for NRI's big 100-page free color catalog, which gives you all the facts about NRI training in Microcomputers, Robotics, Data Communications, TV/Video/ Audio Servicing and other high-tech career fields. (If the coupon is missing, write to NRI, 3939 Wisconsin Ave., Washington, DC 20016.)



Your NRI course includes this modern 64K RAM microcomputer, dual-density disk drive, dot matrix printer... plus a professional LCD multimeter, NRI Discovery Lab and hundreds of demonstrations and experiments. It's all yours to keep.

NRI SCHOOLS
McGraw-Hill Continuing Education Center
3939 Wisconsin Avenue, Washington, DC 20016
We'll give you tomorrow.

All Career courses approved under GI bill.
☐ Check for details.

CHECK ONE FREE CATALOG ONLY

- ☐ Computer Electronics with Microcomputers
- ☐ Data Communications
- ☐ Robotics & Industrial Controls
- ☐ Color TV, Audio, and Video System Servicing
- ☐ Electronic Design Technology
- ☐ Digital Electronics
- ☐ Communications Electronics
- ☐ Industrial Electronics
- ☐ Basic Electronics
- ☐ Telephone Servicing
- ☐ Small Engine Servicing
- ☐ Appliance Servicing
- ☐ Automotive Servicing
- ☐ Air Conditioning, Heating, Refrigeration, & Solar Technology
- ☐ Building Construction
- ☐ Locksmithing & Electronic Security

Name (Please Print) Age
Street
City/State/Zip

Accredited by the National Home Study Council

153-114

TRS-80 is a trademark of the Radio Shack division of Tandy Corp.

possibility, you can have the lines checked by your local phone company. However, phone companies aren't always very cooperative in these cases. They don't certify standard residential lines for telecommunications purposes, so they may not feel obligated to check and repair your lines if they work for regular voice transmissions. Also, if they check your lines and find that something else is to blame, they might charge you for the service call.

If you've succeeded in establishing a link with the remote computer, but the connection is occasionally disrupted, two common problems are party lines and call-waiting services. You should lease a private line if you'll be doing much telecomputing. Otherwise your links will be interrupted everytime someone else on the party line picks up the phone to make a call. The same goes for call-waiting services: The audible click which is your signal that another caller is trying to reach you will confuse the modem and disrupt the link.

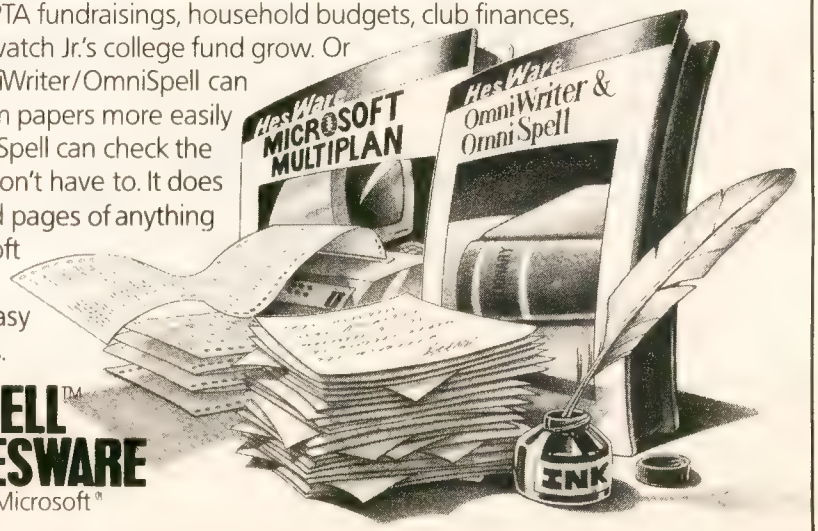
Sometimes a modem problem will be so mysterious that you'll never solve it. This happened to one of our editors. His new direct-connect modem on his home system refused to receive anything but garbage. Step by step we eliminated the possibilities: Everything was hooked up properly; the software was compatible; the communications parameters were correct; and the modem even worked perfectly with the same computer and software on other people's phones around town. Therefore, it seemed that the phone lines were to blame. But when the local phone company finally agreed to check the lines, it declared nothing was wrong.

Then we discovered that another editor's old acoustic modem worked fine on the stubborn system. It didn't make sense—both modems were transmitting at 300 baud and were hooked up exactly the same way, except the new one was direct-connect and the old one was acoustic-coupled. Nobody could explain why one worked and the other didn't. Our final "solution": Since the direct-connect modem worked fine on the other editor's system, they simply traded modems.

Another acquaintance with similar problems discovered that his 64 and modem worked on the telephone in the living room, but did not work on the extension in the family room (where the computer was originally set up). Since one phone line was apparently cleaner, the simple solution was to move the computer.

HERE'S TWO IDEAS FOR A GREAT FAMILY BUSINESS.

Now your family can get into business for themselves without a major investment. With the OmniWriter/OmniSpell and Microsoft award winning Multiplan software programs from HesWare. Multiplan can help Mom keep track of such things as PTA fundraisings, household budgets, club finances, even little league stats. It can help Dad watch Jr.'s college fund grow. Or even his apartment buildings. And OmniWriter/OmniSpell can help your children do homework or term papers more easily and efficiently. In fact, OmniWriter/OmniSpell can check the spelling on over 30,000 words. So you don't have to. It does resumes, personal letters and pages and pages of anything you might want to write. So get Microsoft Multiplan and OmniWriter/OmniSpell working for your family. And see how easy it is to get into your own family business.



OMNIWRITER™/OMNISPELL™ AND MULTIPLAN™ BY HESWARE

Commodore 64 Multiplan™ is licensed for Microsoft®

AT LAST! A FAST, EASY WAY TO LOAD AND COPY COMMODORE 64 PROGRAMS!

KWIK-LOAD™ is the REVOLUTIONARY disk utility that loads most programs using Commodore DOS 3 TIMES FASTER than before!

KWIK-LOAD copies individual files or a complete unprotected Commodore 64* disk 3 TIMES FASTER with one drive and 5 TIMES FASTER with two drives!

KWIK-LOAD includes complete disk editing to rename, delete and undelete files, validate and format disks, edit any track or sector, print-out sectors, and get a directory of the disk FAST!

KWIK-LOAD is menu-driven to do everything QUICKLY AND EASILY! After all, you bought your Commodore 64 to speed up your work. Why wait longer than you have to for your disk to load? ONLY $19.95!

DATAMOST INC.™

The most out of our minds.™

*COMMODORE 64 is a registered trademark of Commodore Business Machines, Inc.

DATAMOST, INC., 20660 Nordhoff St., Chatsworth, CA 91311, (818) 709-1202

SLOWPOKE

Daniel R. Widyono

This very short machine language program, from a twelve-year-old author and programmer, allows you to control the speed of the PRINT command. We've added some suggestions for using this unique routine. For the VIC and 64.

When a Commodore 64 or VIC-20 is printing something or listing a program, you can slow it down by pressing the CTRL key. You have a choice of two speeds, regular and slow. If you've ever used an Apple II, you probably know that it gives you a wider choice; there are 256 printing speeds.

Can a similar feature be added to the VIC or 64? You could use a BASIC subroutine, although it would be rather complicated. You would have to define a string, do a FOR-NEXT loop for the length of the string, use MID$ to pull out a character, print the character, use another FOR-NEXT loop for the delay, then continue until the message is done. The subroutine would work only as part of a program. You'd still have to press CTRL to slow down program listings.

A Better Way

There's a short, simple, and effective machine language alternative to the BASIC subroutine.

Enter and save the following program:

```
10 CK=0:POKE251,0
20 FORJ=679TO703:READA:CK=CK+A:POKEJ,A:NE
   XT
25 IFCK<>3615THENPRINT"CHECK DATA STATEME
   NTS":END
30 DATA72,138,72,152,72,8,166,251,240,8,1
   60,255,136,208,253,202,208,248,40
40 DATA104,168,104,170,104,76
50 IFPEEK(807)<>2THENPOKE704,PEEK(806):PO
   KE705,PEEK(807)
60 POKE806,167:POKE807,2
```

Now run the program and type LIST. It lists as you would expect. Type:

POKE 251,255:LIST

and you'll see a very slow listing. The program takes more than a minute to list (compared to less than a second at the regular speed). POKE a 0 into 251 and the computer returns to normal.

You now have 256 different printing speeds, from zero, the fastest, to 255, the slowest. There's no need to use a BASIC subroutine or to SYS. Just POKE the speed you want into memory location 251. It works within programs and also in immediate mode. It even slows down error messages and the READY prompt. If you use a printer while "Slowpoke" is on, it will wait in between lines (but not between characters). You'll notice, however, that it does not affect your typing; the computer still reads the keyboard at the regular speed.

Pressing RUN/STOP-RESTORE disables Slowpoke. To get it back, you have to either RUN the loader program again or type:

POKE 806,167: POKE 807,2

(If you use these POKEs, make sure you put them on the same line, separated by a colon.)

How It Works

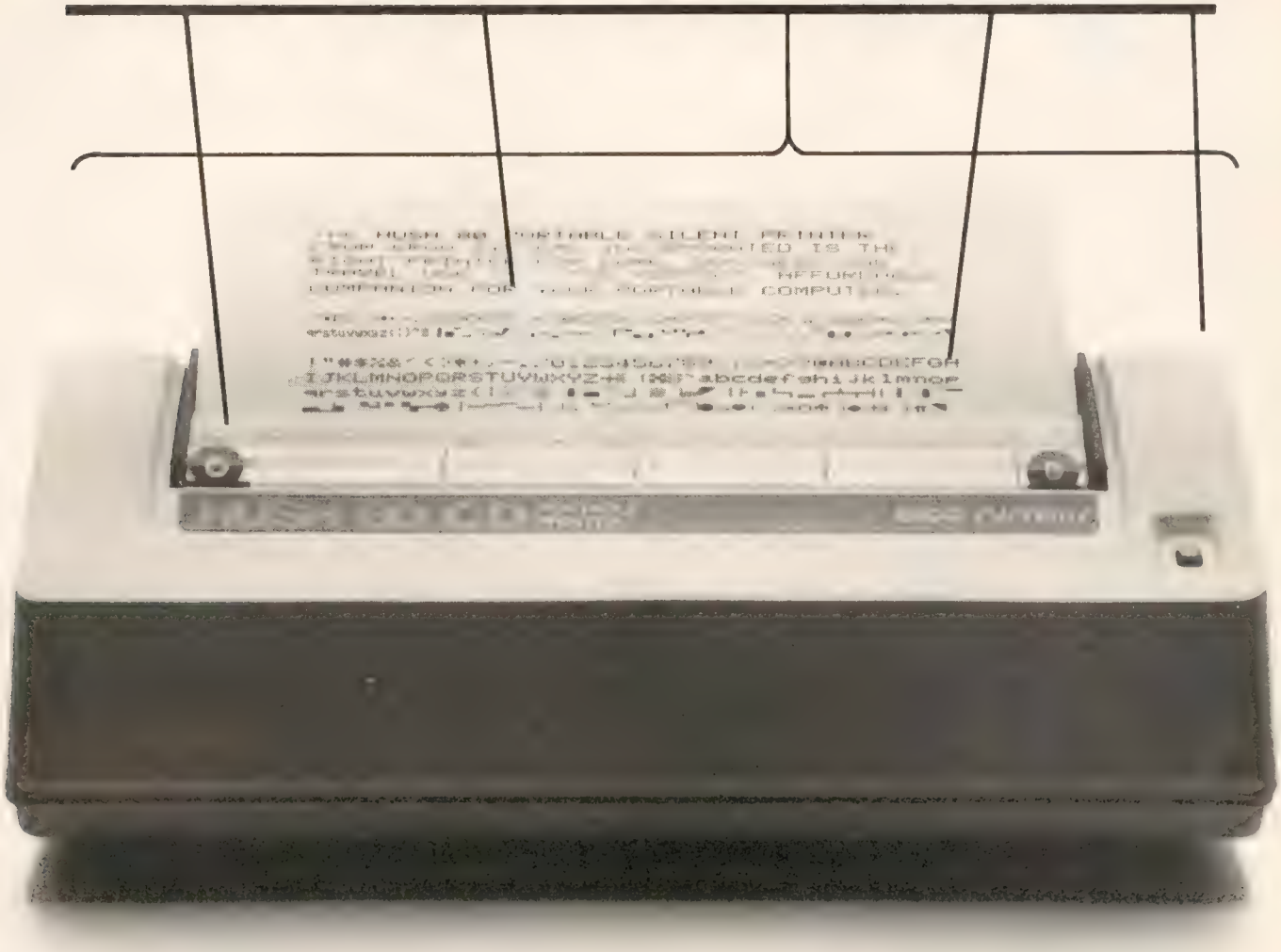
I was looking through a memory map and discovered a *vector* at 806–807 which points to the character out (CHROUT) routine in the operating system. The Kernal CHROUT vector (in ROM, which cannot be POKEd) uses this vector (in RAM, where it can be changed) to find the routine which sends a character out to screen memory, to a printer, or to a tape or disk file.

When the computer gets an instruction to PRINT, it checks the Kernal vector, goes to this vector, and finally ends up at the instructions for printing. The computer has to look up the address for every character it prints, even if the characters are part of a long string. The address is stored in the usual low byte/high byte format.

Vectors are like highway signs pointing the way to a destination (in this case, the character out routine). By changing the numbers in memory locations 806 and 807, we can change the route, adding a slight detour, a machine language delay loop. When the computer tries to PRINT or LIST, the vector at 806–807 sends it to the delay loop, which is followed immediately by a jump to the usual CHROUT part of the operating system.

Since machine language is so fast, we need two delay loops, one inside the other. First, the X register is loaded from location 251. If 251 holds a zero, the rest of the loop is skipped (using BEQ, Branch if EQual to zero). Then the Y register is loaded with the number 255. Y is decremented (DEY) until it becomes zero. Next, X is decremented and a BNE instruction (Branch

BIG ON FEATURES.



$139.99

SMALL ON PRICE.

You read that right. A full 80 column, 80 character-per-second, Commodore-compatible dot matrix thermal printer, complete (with a 90 ft. paper roll, interface cable and power pack), ready-to-run—at 800 words per minute—for only $139.99. But your wallet isn't the only thing the HUSH 80 CD is compatible with. It's compatible with all Commodore models; including the Commodore 64, the VIC 20, and the new Commodore 264.

And you'll find the HUSH 80 CD printer is big on lots of small things too. It weighs about one-half the amount of it's nearest competitor (it's compact size fits conveniently into a briefcase). And it's extremely quiet, with fewer working parts, which means less noise and less to go wrong.

Ask your local computer store or dealer for the HUSH 80 CD today. And if he doesn't carry it, call us at 415/322-ERGO. And find out where to get the little printer that does the big jobs.

HUSH 80 CD PRINTER

LESS PRICE, LESS NOISE, LESS SIZE.

ERGO SYSTEMS, INC. 26254 Eden Landing Road, Hayward, CA 94545

HOW TO WIN THE SAT GAME

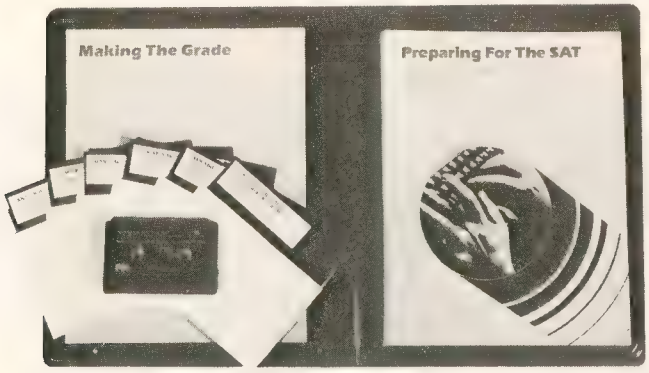
Taking the Scholastic Aptitude Test (SAT) isn't usually thought of as being like a game; but it should be, because it comes down to a battle of wits that's won as much with strategy as with "facts".

"Preparing For The SAT and Other Aptitude Tests" by PDI is a three-way interactive learning system that involves you, your computer and the text, in a process that makes you really SAT-ready.

You will learn:

- How to become a confident, successful test-taker from now on
- How test-makers think and what tests *really* measure.
- Why cramming doesn't help and why playing with puzzles does.
- Why and how to skip questions and increase your score
- How to find the questions you can answer in a snap.

Once you've learned these tips and more—it's on to training in specific parts of the SAT procedure. Not only will you get all the practice you'll want from the programs, you'll also gain a thorough understanding of the principles *behind* the problems.



"Preparing For The SAT" contains the following:

- **Taking Aptitude Tests**—a program that demonstrates what to expect and not expect from the SAT.
- **Making The Grade**—a valuable guide to the world of test-making and test-taking. Includes strategies for many types of tests.
- **A Course Book** which complements the computer programs.
- **Vocabulary Builders**—two courses that help develop your verbal skills.
- **Analogies**—examples of many types of analogies and how to find their "keys".
- **Number Series**—theory and practice in supplying the missing numbers.
- **Quantitative Comparisons**—a review of mathematics from elementary arithmetic through algebra and plane geometry.

"Preparing For The SAT" is available for the Apple II® family of computers; the Commodore 64™ computer with disk drive; the Atari® home computers (both cassette and disk versions are available.) The course is $69.95 on disk and $59.95 on cassette.

"Preparing For The SAT" is available at selected retail outlets or directly from PDI. Call or write for more information.

APPLE is a trademark of Apple Computer Corp
ATARI is a trademark of Atari, Inc

Available at fine stores or direct from PDI.

Program Design, Inc 95 East Putnam Avenue, Greenwich, CT 06830

if Not Equal) loops back to the DEY loop. The higher the number in 251, the longer the loops take. At the slowest printing speed, X has to be decremented 255 times, while Y is decremented 255 × 255 (over 65,000) times.

The values of X and Y are always 0 after the loop is done, so to be safe, the values of the A, X, and Y registers, as well as the processor status, are saved. They are pushed onto the stack before the routine is executed and pulled off after the delay loop.

The delay loop occupies a small area of memory at locations 679–767. If you need this RAM for other ML programs, Slowpoke is relocatable. You can move it to the cassette buffer (location 828 on) or other free sections of memory. If you have a program which uses zero page location 251, change the 251 in line 30 to another available zero page location.

Some Ideas

One useful application of Slowpoke is to slow down program listings. Load and run Slowpoke, then load the program you're working on. You can control the speed of the listing with a single POKE.

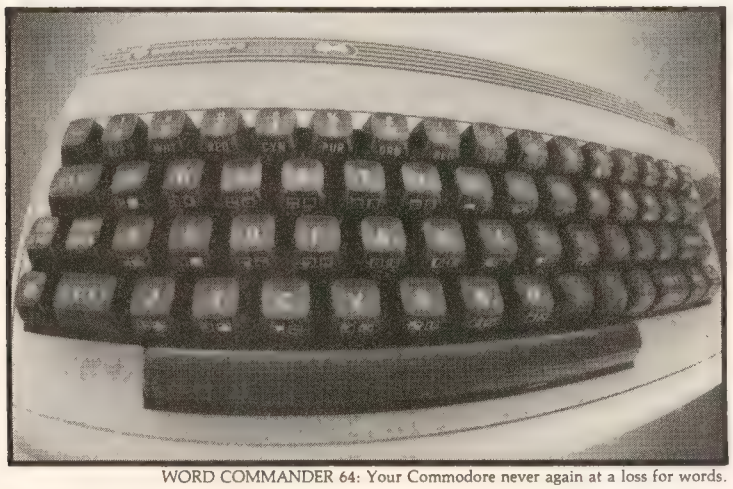
If you are working on a game and the rules take up a couple of screens, you can use this program to make them slowly scroll up, rather than the usual method of printing a screen and waiting for the user to press a key to get the next page. This same idea could be adapted to a story program; at the end of the story, roll the credits (just like at the movies). Many programs which put a lot on the screen could use a printing speed control.

The program is a good debugging tool if you are having problems getting the screen graphics just right. You should note, though, that only the PRINT command is affected; POKEing to screen memory is not any slower than usual.

Slowpoke could be very useful with a program which examines tape or disk files. You would open the file, read an item, print it to the screen, then use a GET statement to see if a key has been pressed. If not, then continue with the next item. If f1 is pressed, speed up the printing; if f7 is pressed, make it slower. It might even be adapted to a speed reading program.

Finally, if you're familiar with machine language programming, you could make a slight modification to add sound effects. Just before the delay loop, turn on the noise generator and turn it off at the end of the loop. Each time you printed something, you would hear, say, the clicking of a typewriter. If you wanted to get really fancy, you could add a bell sound at the end of each line.

"Introducing the Word Processor with Less."



WORD COMMANDER 64: Your Commodore never again at a loss for words.

You have to look very closely to find what we left out of our new word processor. But once you try the WORD COMMANDER 64 you'll discover what's missing. We've taken the *process* out of word processing and put it where it belongs—in our software. With the WORD COMMANDER 64 there's less for you to do and more that it does. And that makes *you* look good.

Only Two Hands.

The WORD COMMANDER 64 is a complete word processor. We've ncluded every function you'll need and ome comforts you'll enjoy. And we didn't hide them in complicated codes or commands that require three hands. Everything about the WORD COMMANDER 64 makes plain sense.

Less Hassle.

When you write you probably change your mind a lot. Now changing your ext is almost as easy as changing your nind. Like when you want to nderline a word or group of words all you do is press "COMMODORE-U" —regardless of the printer control code your printer uses.
Simple.

Less is More.

While simple to use, you won't find the WORD COMMANDER 64 lacking in power or sophistication. We've ntegrated all of the best features into he WORD COMMANDER 64:

- extremely user friendly
- menu driven
- full word wrap
- block text right
- center text
- right justify text
- delete a block of text
- insert a block of text
- move a block of text
- copy a block of text
- three different fonts supported
- print in bold type
- print in elongated type
- allows sending of any control codes to your printer
- select any background color of your preference
- select any character color as well
- select cursor color
- set top, right, bottom and left margin
- set line spacing
- print headers and footers on every page
- automatically number pages
- print subscripts and superscripts
- underline text
- search for specific text
- search and replace
- change margins, font, or justification from within your document
- full 80 column view of the page before printing
- use MMG's MAIL LIST for mail merge capability

Follow Your Ideas.

The words you need to write represent your ideas; and they flow—one after another. So we designed the WORD COMMANDER 64 to work along with your thought processes. And not slow you down. We did that by making it less complicated and easier to use. So easy you probably already know how to use it.

Oh, there's one more thing missing from the WORD COMMANDER 64, the high price: Only $49.95

Includes full manual and tutorial.

How to Get Yours.

Available at your local dealer or direct from **MMG Micro Software**. Just send check or money order to:

P.O. Box 131 Marlboro, NJ 07746

Or for MasterCard, Visa, and C.O.D. deliveries call: **(201) 431-3472**

Please add $3.00 for postage and handling for all direct orders. New Jersey residents add 6% sales tax.

MMG micro software

ZADCO 1984

OMMODORE is a registered trademark of COMMODORE Business Machines Ltd.

Creating Program Listing Files

Richard N. Wilfong

If you've discovered a clever timesaving technique or a brief but effective programming shortcut, send it to "Hints & Tips," c/o COMPUTE!'s GAZETTE. If we use it, we'll pay you $35. Due to the volume of items submitted, we regret that we cannot always reply individually to submissions.

Did you know you can LIST programs on your VIC or 64 to tape or disk files? The results are completely different from using SAVE, and there are a variety of interesting applications for this technique.

The Problem: Adding Comments To ML Programs

Micromon is a good machine language monitor, but you end up short of good documentation. Micromon's assembly feature doesn't allow comments (which are similar to BASIC REMark statements). You can send a disassembled program listing to a printer, but if you want comments you have to write them out on paper.

It becomes a problem when you start to work on a machine language program written months earlier. The original notes might help a little, but you usually end up disassembling the program line by line. (Here's an FFD2, which means print. Next, there's an LDA indexed by Y —where did Y get its value?—and now a loop where the accumulator is rotated.) It can be a mess.

The problem can be solved with an unusual application of CMD. You may know how to print BASIC program listings using CMD (OPEN 4,4: CMD 4: LIST). This BASIC command diverts output from the screen to a previously opened file. CMD 4 sends the program listing to logical device number 4 (in this case the printer) instead of the screen.

Now let's try the same thing, using a disk file to receive the disassembly of an ML program. First, load Micromon and your ML program. In the immediate mode (without a line number), enter:

```
OPEN 2,8,2,"DISKFILE,S,W": CMD 2: SYS 49152
```

First, a sequential file is opened for writing. CMD 2 then tells the computer to send everything to this file instead of the screen. The SYS enables Micromon (assuming you're using Micromon installed at location $C000 on the 64). If you're using another machine language monitor—Supermon or VICMON, for example—change the SYS value accordingly. And, of course, you can call the file something other than *diskfile*.

If you have a tape drive, change the first part to **OPEN 2,1,1,"TAPEFILE"**.

Now use the D command, with a beginning and ending address, to disassemble your ML program. For example, if you have a program in the cassette buffer, you would enter **.D 033C 03FB**. Your disk or tape drive will run for a few moments. You now have to close the file. Exit from Micromon (using the X command) and type:

```
PRINT#2: CLOSE2
```

The newly created file contains an ASCII disassembly, which can be read (and edited) using *EasyScript*. If you use *SpeedScript* (or *WordPro)*, you'll have to change the sequential ASCII file to *SpeedScript* format, using the conversion program in "SpeedScript Revisited" (COMPUTE's GAZETTE, May 1984). Choose option three: *Commodore ASCII to SpeedScript*.

A Real Music Keyboard for Just $99.00!

(Price Includes a Complete Music Software Package Featuring Four-Color Graphics, Recording and Playback!)

Tap the full power of your Commodore 64's* built-in musical instrument with the new MusicMate™ keyboard from Sequential.

The MusicMate keyboard is a fully functional, quality music tool with full-size keys that lets you play your music live and record it. And it's polyphonic so you can play 3 notes at a time. Best of all, the MusicMate gives you this creative flexibility at a very affordable price!

Playing music on a typewriter keyboard or a plastic overlay of miniature-size keys limits your music. We know. We're the largest American manufacturer of professional synthesizers. Our Prophet keyboards are used by your favorite artists on stage and in the studio. We've put our extensive experience in making quality musical instruments into every MusicMate keyboard.

The MusicMate comes with the Model 970 software diskette package that lets you select many different instrument sounds and record and playback up to 10 continuous minutes of your music.

Unlike other remote keyboards, ours doesn't tie up any of your expansion slots. Just plug your MusicMate into your Commodore's joystick port.

Add any one of our exciting software packages to extend the MusicMate's capabilities. They're just $39.95 each.

SONG BUILDER (Model 971)

Build your own songs by overdubbing up to 3 layers of notes (each with its own instrument sound!). Or record 1 – 2 layers of notes and play the third layer *live*. Also, change the key and speed of your music.

SONG EDITOR (Model 972)

See the songs you write with the SONG BUILDER displayed on a four-color Grand Staff on your monitor. And conveniently edit your songs.

SONG PRINTER (Model 973)

The SONG PRINTER prints out your songs in standard music notation.

SOUND MAKER (Model 974)

View a full color graphic display that looks like the front panel of a professional synthesizer to program the shape, volume and tone of your own personal sounds.

Express the music in yourself and your family. Order your MusicMate direct from Sequential *now*!

If you're not completely satisfied with the MusicMate keyboard, just return it within 10 days of receipt to Sequential for a full refund.

We Listen to Musicians,

SEQUENTIAL

For a complete Sequential catalog including decals, send $2.00 to: Sequential, Inc., 3051 North First Street, San Jose, CA 95134.

Commodore 64 is a registered trademark of Commodore, Inc.
*MusicMate is a trademark of Sequential
© 1984, Sequential

Yes, I want to play my own songs on the MusicMate!

Name (Please Print) _____

Street _____

City/State _____ Zip _____

☐ Check or Money Order ☐ Visa ☐ MasterCard ☐ American Express Please do not send cash.

Card # _____

Valid from: _____ to: _____

Signature _____

Quantity			Price
_____	MusicMate(s)	@ $99.00	_____
_____	SONG BUILDER	@ $39.95	_____
_____	SONG EDITOR	@ $39.95	_____
_____	SONG PRINTER	@ $39.95	_____
_____	SOUND MAKER	@ $39.95	_____
	Shipping and Handling		$4.00
	CA residents add 6.5% Sales Tax		_____
	TOTAL PRICE		_____

If not completely satisfied, return MusicMate to Sequential within 10 days for full refund. (Sorry, no returns on computer software, once opened)

Mail order form to: Sequential, 3051 North First Street, Dept. CG, San Jose, CA 95134 Or, use our order line (408) 946-0226.

CG-11-84

LISTing BASIC Programs To A File

Although I originally used this technique to add comments to a Micromon disassembly, it also works on BASIC listings. Follow these steps:

1. LOAD the BASIC program
2. Enter **OPEN2,8,2, "DISKFILE,S,W": CMD 2: LIST**
3. Next, **PRINT#2: CLOSE2**

Tape users should change step 2 to **OPEN2,1,1, "TAPEFILE": CMD 2: LIST.**

A Few Suggestions

It's possible to read through a saved BASIC program by OPENing the file and using GET# to extract pieces of the program byte by byte. Unfortunately, the program will seem to be jumbled. The most confusing thing is that all BASIC commands are in token form. PRINT, for example, appears in program files as a 153 (you can test this by PEEKing a program when it is in memory).

Listing a program converts the tokens to the corresponding BASIC words. A 153 is translated to the five letters P, R, I, N, T. This same process of detokenization happens when you create a tape or disk file with the OPEN, CMD, LIST sequence. The one byte tokens are expanded to the full BASIC commands.

Once the program has been listed to tape or disk, you can do some interesting things.

Assuming you have a word processor and a printer, you can call up the program listing file and edit it as if it were a text file. To make a BASIC program more readable, add some blank lines in between the major routines and subroutines. Believers in structured programming can indent all FOR-NEXT loops and clean up the format.

Machine language programmers using a monitor like Micromon can add (previously unavailable) comments, to clarify the logic of the program. With a SEARCH or HUNT function, you can find all instances of JSR $FFD2 and replace it with the easier to understand JSR PRINT. You can label subroutines and tables.

With a multifont printer, you could add bold, italic, or expanded print headlines to your program.

You can also use program listing files to create much more readable listings on your printer. **OPEN 4,4: CMD 4: LIST** is the most common and simplest way to list to a printer. But certain characters are hard to understand—a reverse heart for "clear screen," a reverse Q for "cursor down," and so on.

Program listing files can help eliminate these difficult characters. First, load the program you want to list. Create a sequential listing file (using the technique described above). Type NEW and enter the following program:

```
1 OPEN1,8,2,"FILENAME,S,R"
2 GET#1,A$:IFA$="{CLR}"THENPRINT"[CLR]";:
  GOTO4
3 PRINTA$;
4 IF ST<>64THEN2
5 CLOSE1
```

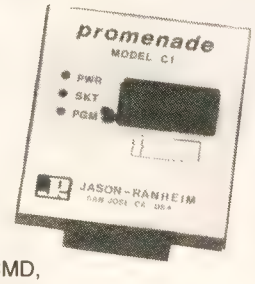
Tape users should change line 1 to **OPEN 1,1,1,"FILENAME"**. Make sure that when you type line 2, the first CLR is the SHIFT–CLR/HOME character (reverse heart) and the second CLR is spelled out, inside square brackets.

This program banishes the reverse heart from your program listings. Instead, you see [CLR]. As it is written, it lists to the screen. To adapt it to a printer, you'll have to OPEN a file to the printer and change PRINT to PRINT#. You can expand this lister program to replace inverse function key characters, cursor controls, color characters, and so on. Just add some more IF-THEN checks.

Line 4 is important because it checks the status variable (ST). When ST is 64, it means you've reached the end of the file. The file is then closed and the lister program ends.

Program Your Own EPROMS

▶ VIC 20
▶ C 64 **$99.50**



PLUGS INTO USER PORT.
NOTHING ELSE NEEDED.
EASY TO USE. VERSATILE.

- Read or Program. One byte or 32K bytes!
- OR Use like a disk drive. LOAD, SAVE, GET, INPUT, PRINT, CMD, OPEN, CLOSE—**EPROM FILES!**
  Our software lets you use familiar BASIC commands to create, modify, scratch files on readily available EPROM chips. Adds a new dimension to your computing capability. Works with most ML Monitors too.
- Make Auto-Start Cartridges of your programs.
- The *promenade*™ C1 gives you 4 programming voltages, 2 EPROM supply voltages, 3 intelligent programming algorithms, 15 bit chip addressing, 3 LED's and NO switches. Your computer controls everything from software!
- Textool socket. Anti-static aluminum housing.
- EPROMS, cartridge PC boards, etc. at extra charge.
- Some EPROM types you can use with the *promenade*™

2758	2532	462732P	27128	5133	X2816A*
2516	2732	2564	27256	5143	52813*
2716	27C32	2764	68764	2815*	48016P*
27C16	2732A	27C64	68766	2816*	

▶ ™Commodore Business Machines
*Denotes electricaly eraseabl types

promenade™

Call Toll Free: 800-421-7731
In California: 800-421-7748

JASON-RANHEIM
580 Parrott St., San Jose, CA 95112

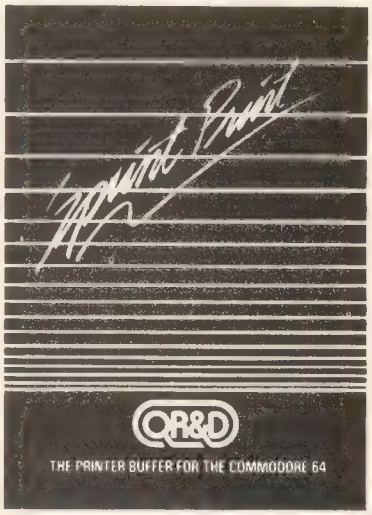
VISA
MasterCard

YOUR COMMODORE JUST GOT TWO TIMES BETTER

INTRODUCING COPY Q AND SPRINT PRINT

Copy Q: The High-Speed Disk Back-Up Program for the Commodore 64 that backs up your copy-protected software. No other C-64 copy program backs up as much. Nothing even comes close. **Copy Q** takes less than eleven minutes to back up a disk. And **Copy Q** backs up most disks in five minutes. All with no user input. **Copy Q** recovers remaining data and files that have been lost to disk errors. No other C-64 copy program works better. **Copy Q** is fast, more reliable, and easier to use. **$45.95**

Sprint Print: The software printer buffer for the Commodore 64. **Sprint Print** gives you control of your computer while printing, remembers everything, and enhances printer speed. **Sprint Print** gives the 1525 and 801 printers true descenders and underlining. **$45.95**



QR&D

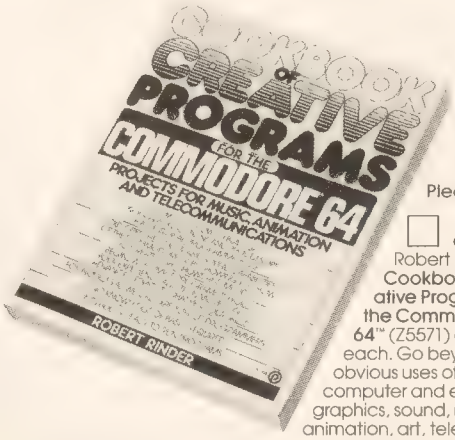
TO ORDER CALL (612) 831-1088

DISTRIBUTED BY RADIX MARKETING 5223 W. 73RD ST MINNEAPOLIS, MN 55435

Are you getting as much out of your Commodore® as Commodore put in?

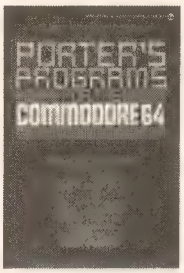
Now you can really begin to tap your Commodore's unused, even hidden potential—with these Commodore computer books and software. Use this ad as your order form, today.

New American Library
P.O. Box 999, Bergenfield, NJ 07621



Please send me:

☐ copies of Robert Rinder's **Cookbook of Creative Programs for the Commodore® 64™** (Z5571) at $12.95 each. Go beyond the obvious uses of your computer and explore graphics, sound, music, animation, art, telecommunications, even robots! These creative and sophisticated programs are written in modular format—with detailed descriptions in between—so you can study how they work even while you input them.



Please send me:

☐ copies of **Porter's Programs for the Commodore® 64™** (XE2090) at $6.95 each. A whole library of BASIC programs for the Commodore® 64™—from financial planning to game creations to text processing—expertly presented by Kent Porter.

NEW! Please send me ☐ copies of the convenient disk version of **Porter's Programs** (XE2099) at just $19.95 each—a special offer for which I am eligible only when I also purchase the **Porter's Programs** book.

1

I enclose check money order (no COD's or cash), or charge ☐ Visa MasterCard, and include $1.50 shipping and handling per order.

Card # Exp. Date

Signature

Name

Address

City State Zip

Allow a minimum of 4 weeks for delivery. This offer, prices and numbers are subject to change without notice Offer expires March 31, 1985.

PLUME SIGNET
NEW AMERICAN LIBRARY NAL

HORIZONS: 64

Charles Brannon
Program Editor

The nearest cousin to the 64 is Commodore's new Plus/4 computer. An evaluation model arrived recently, so let's take an in-depth look at this new machine. It might be well worth your time to compare the features of your 64 to those of this new "productivity" machine before deciding if the Plus/4 is a worthy replacement or significant addition.

Physically, the Plus/4 is tiny, with barely enough room for the keyboard. But packed inside this small box is a complete 64K computer with color graphics, sound, built-in BASIC, and "productivity software." The keyboard's layout is much like the 64's, with a few keys moved around and some extra functions added. The keys are half as high, with a shorter stroke, almost identical to the keyboard of the portable SX-64. The cursor keys are shaped like arrows and arranged in a special cursor pad. Four small rectangular buttons above the keyboard provide eight function keys, with function 8 labeled as HELP. A second CONTROL key replaces the RESTORE key found on the 64 and VIC.

Along the right side of the computer is a power switch and a chip reset button. The reset button performs a cold reset, wiping out your program as if you turned the power off and on. If you hold down the RUN/STOP key as you press the reset button, you call up the built-in machine language monitor, where you can type X to exit to your unharmed BASIC program. When you hold down RUN/STOP as you turn the power on, the Plus/4 goes straight into the ML monitor with BASIC mapped out, giving you a full 64K of memory. By the way, the Plus/4 uses a 6502-compatible microprocessor. Thanks to the Kernal, many useful ROM calls used on the VIC and 64 will also work unchanged on the Plus/4.

The left side of the computer reveals a TV connector and channel 3/4 switch (called H-L). On the back is a square power connector, a standard round serial bus port, a small round cassette port, a user port, a cartridge slot labeled "memory expansion," two small round joystick ports, and an eight-pin round video socket. The serial bus will accept any VIC/64 serial peripheral, so if you already have a 64, you can use your existing disk drive, printer, and most printer interfaces with the Plus/4. The video socket works with a standard video monitor or the 1701/1702/1703 monitor via the rear connections.

Most irksome are the joystick and cassette ports. Even though the same circuitry is used, the connectors have been changed, so you can't just plug in your Datassette or any of dozens of joysticks. Printer interfaces that draw power from the 64's cassette board have no place to plug into the Plus/4. Commodore may well have chosen the smaller connectors to more easily pass FCC regulations (smaller, unexposed connectors may transmit less RF interference). It shouldn't be too hard to rig up an adaptor, if a plug for these strange sockets can be found.

A Powerful BASIC

The Plus/4 has a powerful BASIC, with features of disk BASIC 4.0 teamed with Super Expander graphics, and 60K available for BASIC programming. At last, you can access almost every graphics feature without resorting to PEEKs, POKEs, and machine language. SHIFT-RUN/STOP defaults to loading the first program from disk. No more LOAD "$",8 or OPEN 15. Commands like DIRECTORY, SCRATCH, and RENAME make disk operations smooth and easy. Additional disk commands are: DLOAD, DSAVE, HEADER (New), BACKUP (works only with dual drives), COLLECT (Validate), and COPY.

Missing is any command to initialize the drive. For this you'll need the old OPEN 15,8,15,"I". Unlike CBM BASIC 4.0, there are no DOPEN or DCLOSE commands.

BASIC has been enhanced with structured statements like DO:LOOP UNTIL and IF/THEN..ELSE. GETKEY waits for a keystroke. PRINT USING makes formatted printouts easy. Programming is much easier with KEY, which lets you redefine the function keys. Functions 1-7 can type out any stream of keys. Function 8 types HELP. When your program crashes on an error, you can press f8 to see where your program stopped, with the offending statement flashing. You can DELETE a range of lines, RENUMBER your program, or enter AUTOmatic line-numbering mode. In TRON (TRace ON) mode, the line number is shown as the line executes. TROFF turns off the trace.

GET THE MOST OUT OF YOUR COMMODORE-64 WITH ABACUS SOFTWARE

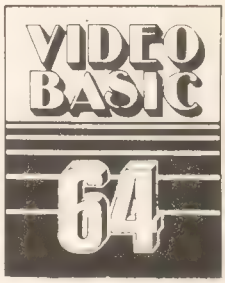
CADPAK-64

This advanced design package has outstanding features - two Hires screens; draw LINEs, RAYs, CIRCLEs, BOXEs; freehand DRAW; FILL with patterns; COPY areas; SAVE/RECALL pictures; define and use intricate OBJECTS; insert text on screen; UNDO last function. Requires high quality lightpen. We recommend McPen. Includes manual with tutorial.

DISK $49.95 McPen lightpen $49.95

VIDEO BASIC-64 DISK $59.95

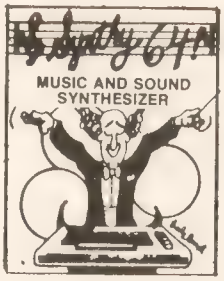
This superb graphics and sound development package lets you write software for distribution without royalties. Has hires, multicolor, sprite and turtle graphics; audio commands for simple or complex music and sound effects; two sizes of hardcopy to most dot matrix printers; game features such as sprite collision detection, lightpen, game paddle; memory management for multiple graphics screens, screen copy, etc.



MASTER 64

This professional application development package adds 100 powerful commands to BASIC including fast ISAM indexed files; simplified yet sophisticated screen and printer management; programmer's aid; BASIC 4.0 commands; 22-digit arithmetic; machine language monitor. Runtime package for royalty-free distribution of your programs. Includes 150 pp. manual.

DISK $84.95



SYNTHY-64

This is renowned as the finest music synthesizers available at any price. Others may have a lot of onscreen frills, but SYNTHY-64 makes music better than them all. Nothing comes close to the performance of this package. Includes manual with tutorial, sample music.

DISK $27.95 TAPE $24.95

CHARTPAK-64 DISK $42.95

This finest charting package draws pie, bar and line charts and graphs from your data or DIF, Mulitplan and Busicalc files. Charts are drawn in any of 8 formats. Change format and build another chart immediately. Hardcopy to MPS801, Epson, Okidata, Prowriter. Includes manual and tutorial.

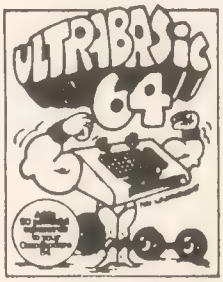
CHARTPLOT-64 DISK $84.95

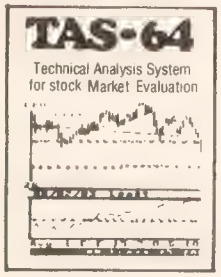
Same as CHARTPAK-64 for highest quality ouput to most popular pen plotters.

ULTRABASIC-64

This package adds 50 powerful commands (many found in VIDEO BASIC, above) - HIRES, MULTI, DOT, DRAW, CIRCLE, BOX, FILL, JOY, TURTLE, MOVE, TURN, HARD, SOUND, SPRITE, ROTATE, more. All commands are easy to use. Includes manual with two-part tutorial and demo.

DISK $27.95 TAPE $24.95

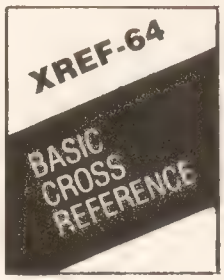




TAS-64 FOR SERIOUS INVESTORS

This sophisticated charting and technical analysis system is easy to use. Plot more than 15 technical indicators on a split screen (price vs. volume); moving averages; oscillators; trading bands; least squares; trend lines; superimpose graphs; five volume indicators; relative strength, volumes, etc. Includes 100 page manual.

DISK $84.95



XREF-64 BASIC CROSS-REFERENCE

This tool allows you to locate those hard-to-find variables in your programs. Cross-references all tokens (keywords), variables and constants in sorted order. You can even add your own tokens so that you can cross-reference tokens from other software such as ULTRABASIC or VICTREE. Listings to screen or all ASCII printers. **DISK $17.95**

*** DEALER INQUIRIES INVITED**

FREE CATALOG Ask for a listing of other Abacus Software for Commodore-64 or Vic-20

DISTRIBUTORS

Great Britain: ADAMSOFT, 18 Norwich Ave., Rochdale, Lancs., 706-524304

Belguim: Inter. Services AVGuilaume 30, Brussel 1160, Belguim, 2-660-1447

France: MICRO APPLICATION, 147 Avenue Paul-Doumer, Rueill Malmaison, France, 1732-9254

Canada KING MICROWARE LTD., 5950 Cote des Neiges, Montreal, Quebec H3S1Z6, 514/737-9335

West Germany: DATA BECKER, Merowingerstr 30, 4000 Dusseldorf, 0211/312085

Sweden: TIAL TRADING, PO 516, 34300 Almhult, 476-12304

Australia: CW ELECTRONICS, 416 Logan Road, Brisbane, Queens, 07-397-0808

New Zealand: VISCOUNT ELECTRONICS, 306-308 Church Street, Palmerston North, 63-86-696

Commodore 64 is a reg. T.M. of Commodore Business Machines

AVAILABLE AT COMPUTER STORES, OR WRITE:

Abacus Software

P.O. BOX 7211 GRAND RAPIDS, MICH. 49510

For postage & handling, add $4.00 (U.S. and Canada), add $6.00 for foreign. Make payment in U.S. dollars by check, money order or charge card. (Michigan Residents add 4% sales tax)

FOR QUICK SERVICE PHONE 616-241-5510

Sound And Music

Once you've heard the SID chip, the Plus/4's sound is rather disappointing. Still, it has 10-bit resolution, two clear voices, and white noise capability—something of an improvement on the VIC-20 sound chip. It acts like the sound chip used in the TI-99/4A. VOL controls the volume, from 0 (off) to 8 (loud). SOUND x,y,z plays pitch y on voice x for z sixtieths of a second. Using VOL, you can simulate a crude ADSR envelope. It's a usable sound device, with no frills, and it's a lot easier to program than the mighty SID. For games, it should produce acceptable bleeps, blats, whirs, and explosions. The sound is good enough for music. If only we hadn't been spoiled by the SID chip.

121 Colors

The Plus/4 has almost the same text and graphics modes as the 64, but with a plus—121 colors. The basic 16 colors—except black, of course—can be displayed in any of eight brightness levels. This gives you eight grays, or a red ranging from a summer sunset to a flamingo pink; a muddy brown to a lemon-yellow. Since the three grays available on a 64 are replaced by the eight different shades of white, there are some new colors, including blue-green and yellow-green. You have all 121 colors available in text mode. In addition, text can be displayed in reverse color or flashing at the same rate as the cursor. All the Commodore graphics characters are supported, including upper/lowercase mode.

This BASIC is a graphics extravaganza. There are two bit-mapped modes: high resolution and multicolor. High resolution gives you 320 × 200 dots. Each 8 × 8 pixel zone (the same area as a single character) can have its own foreground color. When two colored lines intersect, the conflicting region is only one of the colors. You have much better color control but half the horizontal resolution in multicolor, with four non-interfering colors and 160 × 200 resolution. There are separate memory locations for each color, which you can set with the COLOR statement. Additionally, if you change the third color register, anything drawn in that color will instantly change, letting you make large areas of the screen flash and glow.

The GRAPHIC command selects whether you want high-resolution or multicolor. Two of the modes have a five-line text window at the bottom, so you can try out graphics in direct mode. A fault with the text window is that it's easy to move the cursor out of the window and "under" the graphic screen where you can't see it. You can also elect whether or not to clear the screen when you change modes. After a GRAPHIC call, BASIC is moved above the graphics screen, and 10K of memory is lost from BASIC to be allocated to graphics. GRAPHIC CLR will return the memory after you are finished with graphics. The text mode is GRAPHIC 0.

Graphics Commands

The DRAW command lets you draw points and connected lines. CHAR is used to place text on either the text screen or on the graphics screen at any X,Y position. BOX can draw any rectangular shape at any angle. The CIRCLE command lets you draw round circles, ovals, arcs, or polygons, in color and at any angle of rotation. PAINT fills in any area of the screen. It can fill any strange shape, as long as it's completely enclosed.

There are no commands for sprites, simply because there are no sprites. How can you program games in BASIC without sprites? Well, you could draw and erase shapes in the graphics modes, which is what GSHAPE and SSHAPE seem to be for. SSHAPE stores a rectangular area of the screen into a string. Since a string can only hold 255 bytes, there is a limit to how big a shape you can grab. GSHAPE can then draw the shape anywhere on the screen. With the Exclusive-OR option of GSHAPE, you can move small objects without disturbing the background, but it's too slow for fast action games. Looks like we'll need turbo-coded machine language for game programming. Another option is character animation, which is fast, but coarse.

Productivity Software: 3 + 1

The built-in word processor, spreadsheet, data base, and bar charts are supposed to be the clincher. Who needs sprites when you have these? When you turn on the computer, pressing f1 switches on the software. It's a big package, with a huge manual. You'd think that easy-to-use software wouldn't need such a large manual. Having used this software, I can only say it's mediocre compared to the best commercial software for the 64.

The word processor comes up with yellow text on a black background, although you can change the colors to a more pleasing combination. It gives you a maximum of 99 lines, not a lot of text, which makes it more appropriate as a letter or memo processor. Horizontal scrolling gives you more than 40 characters per line. It has a lot of features and commands, but is very hard to learn and use. The command TS jumps to the spreadsheet. As spreadsheets go, this one isn't bad, but it is slow. You can split the screen and have the word processor in the top half and the

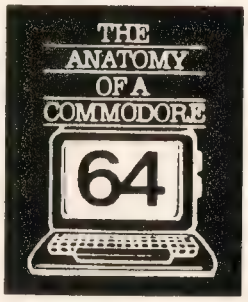
FOR COMMODORE-64 HACKERS ONLY!

The ultimate source for Commodore-64 Computer information

THE ANATOMY OF THE COMMODORE 64

is the insider's guide to the lesser known features of the Commodore 64. Includes chapters on graphics, sound synthesis, input/output control, sample programs using the kernal routines, more. For those who need to know, it includes the complete disassembled and documented ROM listings.

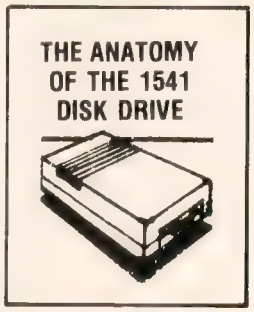
ISBN–0-916439-00-3 $19.95



THE ANATOMY OF THE 1541 DISK DRIVE

unravels the mysteries of using the misunderstood disk drive. Details the use of program, sequential, relative and direct access files. Include many sample programs - FILE PROJECT, DIRECTORY, DISK MONITOR, BACKUP, MERGE, COPY, others. Describes internals of DOS with completely disassembled and commented listings of the 1541 ROMS.

ISBN–0-916439-01-1 $19.95



THE C–64 MACHINE LANGUAGE BOOK

is aimed at those who want to progress beyond BASIC. Write faster, more memory efficient programs in machine language. Test is specificall geared to Commodore 64. Learns all 6510 instructions. Includes listings for 3 full length programs: ASSEMBLER, DISASSEMBLER and amazing 6510 SIMULATOR so you can "see" the operation of the '64.

ISBN–0-916439-02-X $14.95

TRICKS & TIPS FOR THE COMMODORE 64

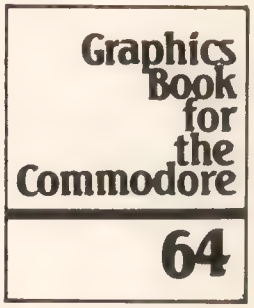
is a collection of easy-to-use programming techniques for the '64. A perfect companion for those who have run up against those hard to solve programming problems. Covers advanced graphics, easy data input, BASIC enhancements, CP/M cartridge on the '64, POKEs, user defined character sets, joystick/mouse simulation, transferring data between comuters, more. A treausre chest.

ISBN–0-916439-03-8 $19.95

GRAPHICS BOOK FOR THE COMMODORE 64

takes you from the fundamentals of graphic to advanced topics such as computer aided design. Shows you how to program new character sets, move sprites, draw in HIRES and MULTICOLOR, use a lightpen, handle IRQs, do 3D graphics, projections, curves and animation. Includes dozens of samples.

ISBN–0-916439-05-4 $19.95



ADVANCED MACHINE LANGUAGE FOR THE COMMODORE 64

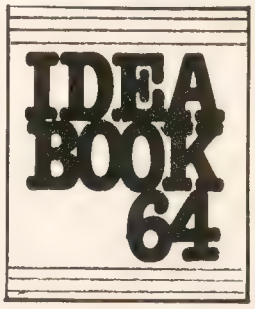
gives you an intensive treatment of the powerful '64 features. Author Lothar Englisch delves into areas such as interrupts, the video controller, the timer, the real time clock, parallel and serial I/O, extending BASIC and tips and tricks from machine language, more.

ISBN–0-916439-06-2 $19.95

THE C–64 IDEA BOOK

is for those who wonder what you can do with your '64. It is written for the novice and presents dozens of program listings the many, many uses for you computer. Themes include: auto expenses, electronic calculator, recipe file, stock lists, constructioin cost estimator, personal health record, diet planner, store windo advertising, computer poetry, party invitations and more.

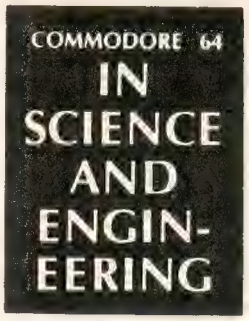
ISBN–0-916439-07-0 $12.95



C-64 SCIENCE ENGINEER

is an introduction to the world of computers in science. Describes variable types, computational accuracy, computers in science. Describes variable types, computational accuracy, various sort alogrithms. Topics include linear and nonlinear regression, CHI-square distribution, Fourier analysis, matrix calculations, more. Programs from chemistry, physics, biology, astronomy and electronics. Includes many program listings.

ISBN–0-916439-09-7 $19.95



DEALER INQUIRIES ARE INVITED

If any of the titles featured above are not available at your local bookstore or computer outlet, ask them to order direct from Abacus Software.

IN CANADA CONTACT:

The Book Centre, 1140 Beaulac Street
Montreal, Quebec H4R1R8 Phone: (514) 322-4154

Commodore 64 is a reg. T.M. of Commodore Business Machines

OTHER NEW BOOKS ARE COMING SOON!

AVAILABLE AT COMPUTER STORES, OR WRITE:

Abacus Software

Exclusive U.S. DATA-BECKER Publishers

P.O. BOX 7211 GRAND RAPIDS, MICH. 49510

For postage & handling, add $4.00 (U.S. and Canada), add $6.00 for foreign. Make payment in U.S. dollars by check, money order or charge card. (Michigan Residents add 4% sales tax).

VISA MasterCard

FOR QUICK SERVICE PHONE 616-241-5510

spreadsheet at the bottom. You can move values from the spreadsheet to the word processor, or move text the other direction.

The so-called graphics option can turn a column of the spreadsheet into a scaled bar chart. The bar chart is several vertical lines made up of # signs, inserted into the word processor. You use the word processor to type in labels and values.

The file manager lets you create records with up to 17 lines, each holding up to 38 characters. The records are stored on their own disk. You must dedicate an entire disk to your data base. You can sort the data, even merge it with the word processor. A search command lets you quickly find a record or series of similar records. This is a minimal program, but it works.

In general, the built-in software is useful, but lacks flair. Instead of being menu driven or activated with keystrokes, the software is controlled in command mode, where you type several characters (the name of the command). Writing or calculating requires you to memorize a list of cryptic sequences. The word processor is clumsy. INST/DEL affects the entire document, not just one paragraph, unless you set a pointer to the current line. INST/DEL works up to a pointer, so you can set and clear pointers as needed, but you have to switch to command mode first. The horizontal scrolling can drive you crazy, since the cursor wraps around at the left margin. It's hard to write when you can't see half of what you've written. The horizontal scrolling is handy for business use, though, making it easier to set up 80-column charts and tables.

It's not clear who will buy this machine, though it may sell well. Software houses are concerned that they can't sell a word processor, spreadsheet, or data base to owners of this machine. They needn't worry. Only a little work is needed to improve on the built-in software. If the Plus/4 succeeds, a translation of *SpeedScript* would be a natural. With the new super-fast parallel disk drive, the SFS 481, which works only with the Plus/4, perhaps small businesses can use the machine. Even though it lacks many game features, the machine has an excellent BASIC and built-in machine language monitor, making it a good machine for teaching and learning programming. The built-in software will at least permit anyone to use the machine right out of the box. Finally, the price is fairly low, just under $300.

What's intriguing is that this machine costs more than a 64, but *must* be cheaper to produce. In hardware, the most expensive parts are the chips. The Plus/4's single TED chip integrates a video chip, sound chip, a timer, and keyboard circuitry. All you need is a microprocessor, memory, and a few support chips to make the Plus/4. The case is small, the keyboard probably is cheaper than the 64's, and it uses the less expensive sockets. All in all, Commodore could probably sell this machine for around $100 and still do well. Perhaps this is their secret plan. The 64 first sold well at $600, and gobbled up the home computer market like a voracious Pac-Man at $200. And if the Plus/4 could sell for $100, why give up your 64? Buy a Plus/4 and you have *two* computers, without re-investing in disk drives and printers.

You can't use much of your 64 software on this machine, except those BASIC programs that don't use POKEs, PEEKs, or machine language. (Can you think of any that don't?) If you own both a VIC and a 64, you'll have some idea of the compatibility problems. But the Plus/4 is an interesting machine.

Warp Drive For Your Disk Drive?

You might be interested in a program that lets you load programs three times as fast from your 1541. First mentioned in our CES story, *Kwik-Load* is a simple and effective product. When you load *Kwik-Load* into memory, program LOADs proceed at a bearable pace. It really works. We loaded "Campaign Manager" in 7 seconds with *Kwik-Load* versus the normal 21 seconds. High-resolution screens come in a line at a time. It seems that this is the solution to 1541 "wait states."

But *Kwik-Load* has many limitations. It cannot load most commercial software or programs like *SpeedScript* which take over the entire machine. Apparently, *Kwik-Load* requires a little space at the tail end of the reserved block $C000-$CFFF, which isn't a very safe space after all.

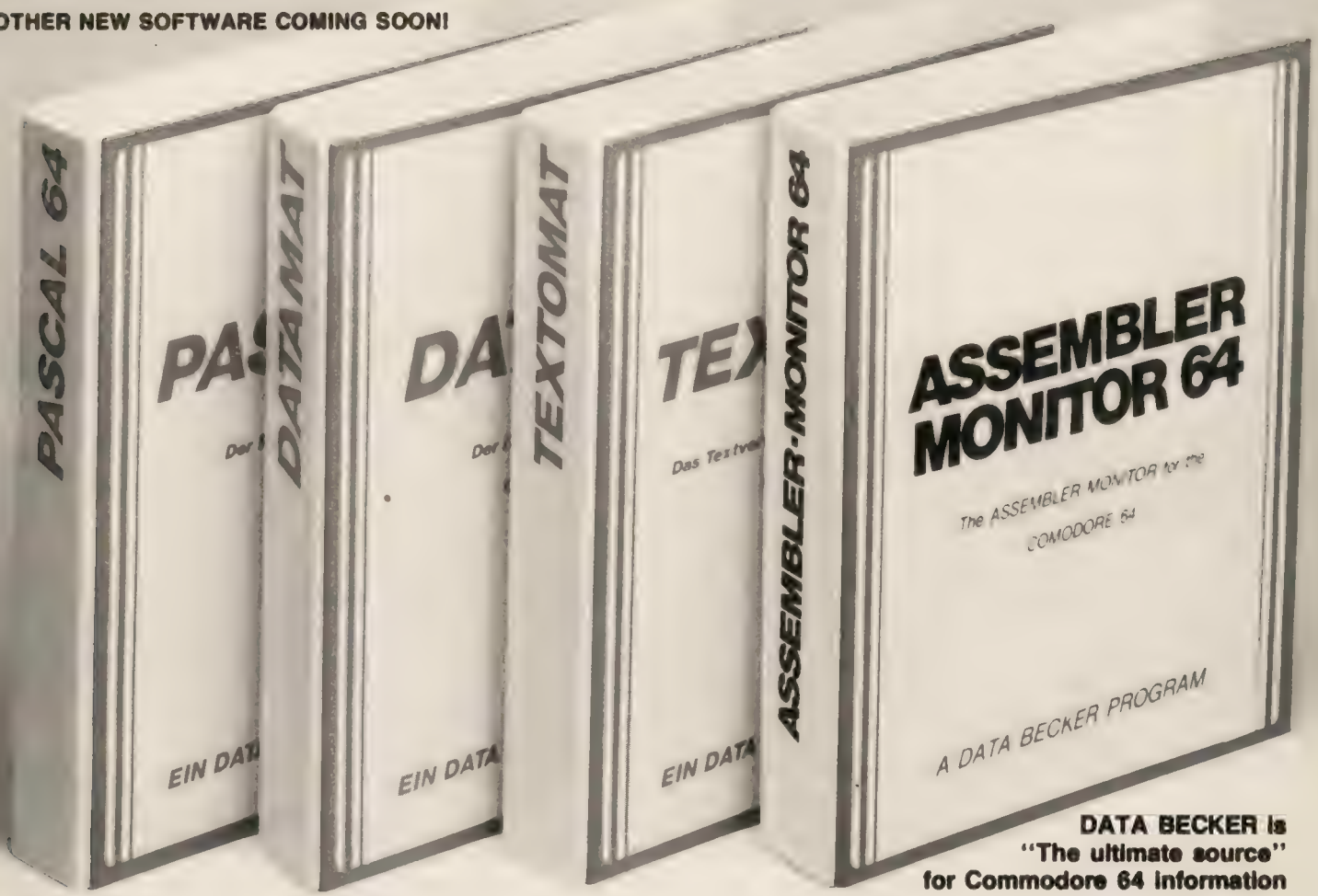
However, *Kwik-Load* includes a highly useful menu-driven disk program. You can copy disks three times as fast, and format disks at more than twice normal speed. You can scratch, rename, or validate a disk. Also included is a disk speed check. If a 1541 is having trouble, alignment, not speed, is the thing to check first, but a proper speed of 300 rpm is important, too. A disk sector editor that lets you read and write hexadecimal and ASCII data directly to the disk is a handy tool for learning about a disk, or recovering damaged files. Given this bonus, and despite the limitations, *Kwik-Load* is a good buy at $19.95.

Kwik-Load
DATAMOST
20660 Nordhoff Street
Chatsworth, CA 91311-6152
$19.95

SERIOUS 64 SOFTWARE

INDISPENSIBLE TOOLS FOR YOUR COMMODORE 64

OTHER NEW SOFTWARE COMING SOON!



DATA BECKER is "The ultimate source" for Commodore 64 information

---

PASCAL 64

This full compiler produces fast 6502 machine code. Supports major data Types: REAL, INTEGER, BOOLEAN, CHAR, multiple dimension arrays, RECORD, FILE, SET and pointer. Offers easy string handling, procedures for sequential and relative data management and ability to write INTERRUPT routines in Pascal! Extensions included for high resolution and sprite graphics. Link to ASSEM/MON machine language.

DISK $39.95

DATAMAT 64

This powerful data base manager handles up to 2000 records per disk. You select the screen format using up to 50 fields per record. DATAMAT 64 can sort on multiple fields in any combination. Complete report writing capabilities to all COMMODORE or ASCII printers.

Available November **DISK $39.95**

TEXTOMAT 64

This complete word processor displays 80 columns using horizontal scrolling. In memory editing up to 24,000 characters plus chaining of longer documents. Complete text formating, block operations, form letters, on-screen prompting.

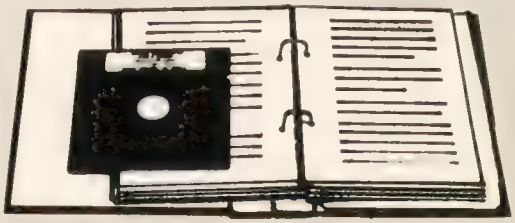
Available November **DISK $39.95**

ASSEMBLER / MONITOR 64

This complete language development package features a macro assembler and extended monitor. The macro assembler offers freeform input, complete assembler listings with symbol table (label), conditional assembly. The extended monitor has all the standard commands plus single step, quick trace breakpoint, bank switching and more.

DISK $39.95

DEALER INQUIRIES INVITED



All DATA BECKER software books have inside disk storage pockets, and heavy vinyl ring-binder covers for maximum durability and easy reference access.

AVAILABLE AT COMPUTER STORES, OR WRITE:

Abacus Software

P.O. BOX 7211 GRAND RAPIDS, MI 49510

Exclusive U.S. DATA BECKER Publishers

For postage & handling, add $4.00 (U.S. and Canada), add $6.00 for foreign. Make payment in U.S. dollars by check, money order of charge card. (Michigan Residents add 4% sales tax.)

VISA MasterCard

FOR QUICK SERVICE PHONE (616) 241-5510

Commodore 64 is a reg. T.M. of Commodore Business Machines

Dan Carmichael, Assistant Editor

VIC Mailbag

In this month's column, we'll take a look in the mailbag and answer a few questions.

Shifting Gears

Page 9 of the 1541 disk drive instruction manual states that the speed of the 1541 must be changed when it is used with the VIC. The command: OPEN 15,8,15,"UI-" is supposed to be entered before reading or writing to the 1541.

I have used the disk drive with my VIC on a number of occasions without first setting the speed, and it seems to perform fine. I am concerned, though, because the drive ended up quitting, and had to be returned to Commodore for repair. Could the failure to set the speed have been the cause of the breakdown?

Timothy Haley

The UI− and UI+ commands are used to change the speed of the 1541. They do not actually change the speed of the disk drive's motor, but instead change the speed at which the drive internally accepts or writes data.

Commodore recommends that before using the 1541 with the VIC-20, you type *OPEN 15,8,15,"UI−"*. This changes the speed of the 1541 for use with the VIC-20. However, this is optional. Here's why.

The disk drive model previous to the 1541, the 1540, was designed to operate with the VIC-20, and transferred data at a faster rate than the newer 1541.

The biggest misunderstanding of the UI−, UI+ command is that UI− (because of the minus sign) slows the speed of the 1541. In fact, it speeds up the rate of transfer, and emulates the faster speed of the 1540.

This is the reason the 1541 performs adequately with the VIC-20, even when the UI− command is not entered. On the other hand, the Commodore 64 is set to accept data at a slower rate (UI+), and might experience problems if it's used with a 1540 or a 1541 set at the faster speed. One of the main reasons that the 64 is slightly slower is that it must maintain a thousand characters on its video display, compared to only about 500 for the VIC. This also explains why 64s have to blank the screen whenever cassette files are accessed, as timing is equally important in cassette operations.

It should be noted that initializing the 1541 (OPEN 15,8,15: PRINT#15,"I0":CLOSE15) will automatically reset it to the default setting of the slower speed.

Neglecting to enter the UI− command was not the cause of your hardware failure.

VIC to 64 Conversions

If I get a 64K or 32K expansion cartridge and a 40-column board for my VIC, will I be able to run Commodore 64 programs on it? If not, what would be another way of modifying my VIC programs to run on the 64?

Michael Scarola

BASIC programs which do not contain POKEs, PEEKs, or other machine specific routines should run equally well on the VIC and 64. However, because most programs contain POKEs and/or PEEKs, the answer is generally no.

It makes no difference if the VIC's memory is expanded or unexpanded. The lack of compatibility stems from the differences in memory locations, *not* memory size. For example, changing screen and border colors in the VIC is done with a single POKE to 36879, while in the 64 it takes two POKEs to memory locations 53280 and 53281. Also, producing sound with the 64's sophisticated SID (Sound Interface Device) chip is more complicated and requires many more POKEs than is necessary to produce sound on the VIC. This list of differences goes on.

The only way to convert VIC programs to run on the 64 is to go through them line by line, and change all the machine specific routines, POKEs, and PEEKs.

Mysterious POKEs

At the beginning of many programs for the VIC-20, I have seen two memory locations (36869 and 36879) POKEd with different

SMART PERIPHERALS FOR THE COMMODORE 64*!

WHEN IT COMES TO BOOKS, WE'VE GOT YOU COVERED!

You probably already know about our two best-selling books, *Kids and the Commodore 64* and *The Elementary Commodore 64*. Both have been on top of the charts for a year, receiving rave reviews in the process. But do you know that we have other great Commodore 64 books? Books that teach and inspire. Books that cover almost any application you can think of, to help you and your Commodore come to a better understanding. No matter what age you are. Or what level you're at. Whatever computer questions you have, Datamost has the answers!

KIDS AND THE COMMODORE 64
For kids of ALL ages. An easy-to-understand book designed to make learning BASIC a fun and exciting experience. Guidance, explanations, exercises, study-guides, reviews and quizzes in a workbook format. **$19.95**

THE ELEMENTARY COMMODORE 64
Explains the Commodore 64 in simple, everyday language. How to hook it up, use the keyboard and program in BASIC. Teaches about word processing, utilizes and peripherals. **$14.95**

GAMES COMMODORES PLAY (C-64)
A collection of classic computer games. Simply type them in and make modifications. Learn BASIC the fun way! **$14.95**

THE COMMODORE 64 HOME COMPANION
This is the book that SHOULD HAVE come with your Commodore 64. Straight answers to home computing questions, dozens of software reviews, BASIC and more! **$19.95**

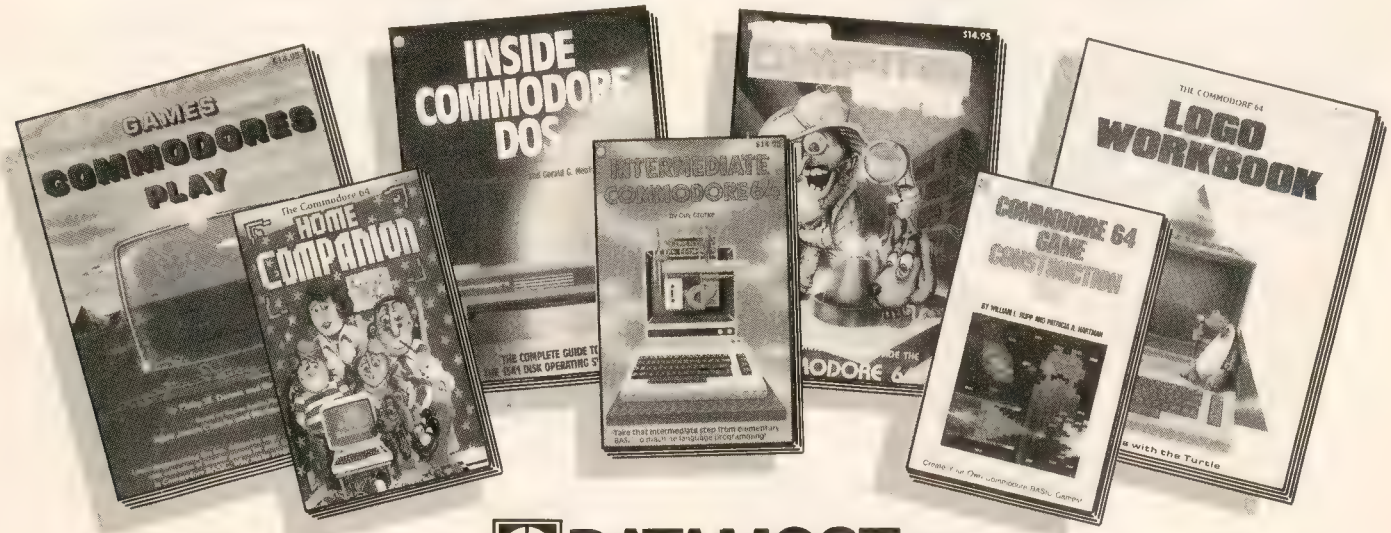
INSIDE COMMODORE DOS
The inside story on how Commodore's 1541* disk drive works. Complete information on formatting, storage, backing up "protected" disks and recovering damaged data. **$19.95**

THE INTERMEDIATE COMMODORE 64
The intermediate step between elementary BASIC and machine languages. Learn about structured programming, flow charts, algorithms, text files and enhanced graphics. **$14.95**

THE SUPER COMPUTER SNOOPER (C-64)
Learn how a computer "thinks." Investigate memory, screen, programs and variables, keyboards, printers and expansion boards. For the BASIC programmer who wants to move on. **$14.95**

COMMODORE 64 GAME CONSTRUCTION TOOL KIT
Write your own BASIC games! Game tools, techniques, graphics, sound, sprites and fundamental lessons of quality same programming are all included. **$14.95**

COMMODORE 64 LOGO WORKBOOK
Teaches grades 2-6 how the LOGO programming language can be used for problem solving. Learn about the "turtle," variables, geometry and recursion. **$12.95**



DATAMOST INC

20660 Nordhoff St., Chatsworth, CA 91311, (818) 709-1202

*Commodore 64 and 1541 are trademarks of Commodore Business Machines, Inc.

numbers. I'd like to know what these memory locations are used for.

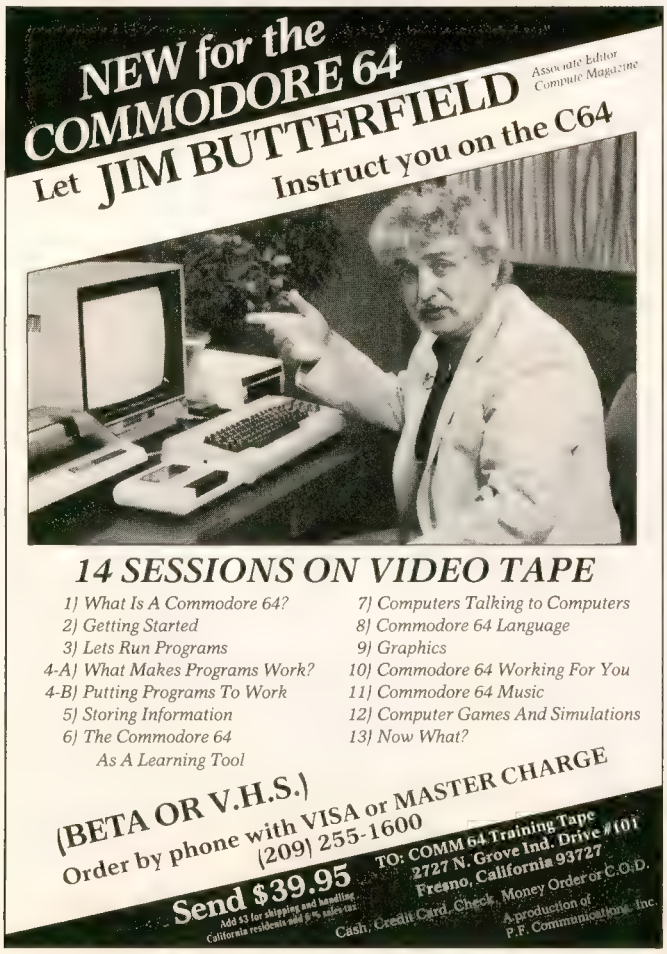
Jim Walunas

Memory location 36879 is used to set the screen and border colors and to toggle the character set between the inverted and normal mode. By POKEing various values here you can change the screen and border colors or turn on/off the reversed character set. The first three bits (0–2) give you eight border colors, bit 3 turns the inverse screen on or off, and the top four bits control the sixteen available screen colors.

Memory location 36869 is used to control the screen and character memory addresses.

Bits 0–3 of this byte point the VIC (Video Interface Chip) chip to the character set. The normal value of these four bits is 0. Changing this value causes the VIC chip to look elsewhere for the character set information. This is done when, for example, you want to use a custom character set you have put in RAM.

Bits 4–7 in combination with bit 7 of memory location 36866 are used to determine the beginning address of screen memory. To change the location of screen memory, the value of these bits must be changed as well as the value of memory location 648, which tells the computer's operating system where to look for screen memory.

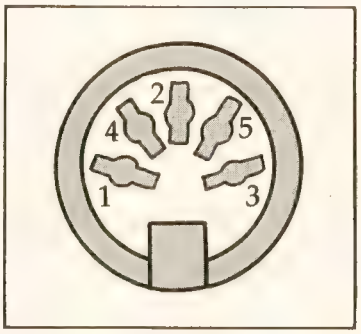


Adding Sound

I have a VIC-20 and a BMC monitor. I've figured out which pins are used to connect the monitor, but I am unsure how to hook up the sound. Is there a way to hook up a speaker at the same time?

David Grant

Yes. On the rear of your VIC, there is a 5-pin DIN plug that is used for audio/video connections . The wiring for the 5 pins is as follows:



1. +5 volts reg.
2. ground
3. audio
4. video low
5. video high

To hook up your sound, connect one speaker wire each to pins 2 and 3. It should be noted, however, that driving a speaker straight from the plug might damage the VIC chip. For this reason, you should connect the two pins to the input of an amplifier, and connect the speaker to the amplifier output.

You should be able to find a small utility amplifier at your local electronics dealer. Another suggestion might be to hook pins 2 and 3 up to your stereo amplifier. The auxiliary input jacks are good for this purpose.

When wiring to your stereo, be careful with the polarity of the connections.

The Incompatible 1526

My VIC-20 and Commodore 1526 printer don't seem to get along. I have not been able to print a program listing. When I enter the standard OPEN 4,4: CMD4: LIST commands, I only get about three lines of the program, then the printer shuts off. What am I doing wrong?

Bob Le Beau

According to Commodore, the latest versions of the 1526 are for use with the Commodore 64 only. A few problems have arisen with incompatibility between the VIC and this printer. These stem from serial bus allocation problems, especially when the tape drive is used with the VIC.

If you are using a 1526 and a tape drive, try this: Immediately after any cassette activity, including LOADs or SAVEs, type *SYS64490*. This Kernal routine clears the serial bus, and prepares it for use with the printer.

Programming Sound And Graphics With The *Super Expander 64*

Lee Noel, Jr., Assistant Editor, Art & Design

Tired of endless PEEKing and POKEing to get the sound and graphics you want on your 64? This cartridge offers some alternatives.

The programming capabilities of *Simons' BASIC* have drawn considerable attention from 64 owners. But Commodore's *Super Expander 64*, while less well known, is a powerful and flexible tool which offers several useful features not found in *Simons' BASIC*.

The *Super Expander 64* (which sells for about $50) is a ROM cartridge—a program frozen in the memory of a computer chip.

Unlike the widely used *Super Expander* for the VIC-20, this cartridge does not provide any additional memory for the 64. In fact, it consumes some, leaving 30719 bytes free for BASIC programming. However, the many powerful features more than compensate for the lost memory.

Essentially, the *Super Expander 64* extends the 64's BASIC programming language, giving the user more direct control over the computer's sound and graphics. Among its features are ten different preprogrammed instrument sounds, a built-in sprite editor, and direct mode control of all its features—none of which are available in *Simons' BASIC*.

The Language Of The Expander

Since the *Super Expander 64* is a program in ROM, it's immediately and permanently available to you as soon as you turn on your computer. To use it, you have only to learn some new BASIC keywords and include them in your programs.

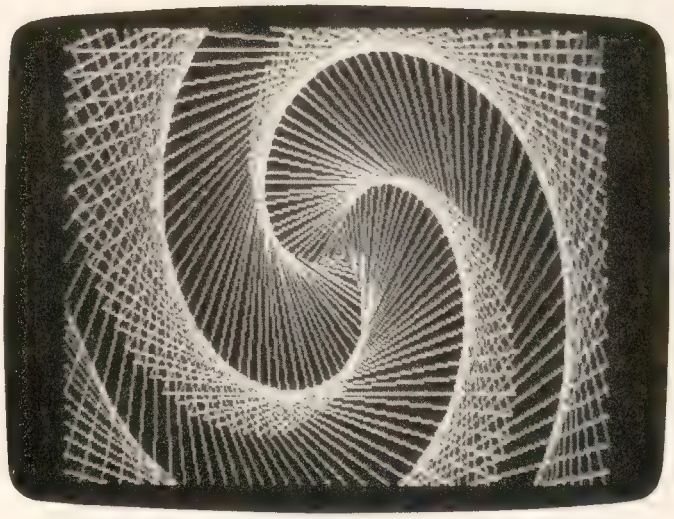


Figure 1

The expander adds 32 new words to BASIC: BOX, CHAR, CIRCLE, COLINT, COLOR, DRAW, FILTER, GRAPHIC, GSHAPE, KEY, LOCATE, MOVSPR, PAINT, RBUMP, RCLR, RDOT, RGR, RJOY, RPEN, RPOT, RSPCOL, RSPPOS, RSPR, SCALE, SCNCLR, SPRCOL, SPRDEF, SPRITE, SPRSAV, SSHAPE, TEMPO, and TUNE.

While this is a fairly lengthy list, it's still quite manageable by comparison to *Simons' BASIC's* 100-plus new words—more than 40 of which are needed to cover the sound and graphics features offered by the expander.

Many of the words are self-explanatory. For example, BOX draws a box, PAINT fills a shape with color, TEMPO sets the general speed for music and sound effects, and so on. Even the odd looking words were carefully devised. Words

starting with R return information to the program, GSHAPE (G for GET) puts a previously saved area of bitmap back on the screen, and SSHAPE is the command that saves a piece of bitmap. For the most part, the new words are readily comprehensible, and brief experiments tend to clear up any problems very quickly.

These keywords, termed *commands* and *functions*, are combined with additional elements, *parameters* and *arguments*, to form statements in the extended BASIC.

To help you master the expander, there is a 65-page manual that explains in relatively plain English how to use the program. But as often happens in documentation of this kind, there are a few minor errors. In the manual, each command or function is followed by a combination of numbers and punctuation marks in a set group—not unlike BASIC commands.

But for those using the manual, a word of warning is in order. Using the expander word CIRCLE, here's a sample of the the way the manual charts a keyword and its attendant parameters.

CIRCLE[source],[X1,Y1]<,X-rad>[,[y-rad][,[start][,[end][,[angle][,[inc]]]]]]

This is difficult enough to type; let alone comprehend. Not surprisingly, the manual itself misses the occasional bracket. Just ignore this system—all you have to do is count the number of parameters and figure out what each of them does. You'll very quickly come to understand them on your own terms.

How does all this work in practice? Let's look at a graphics display generated with the aid of the expander. The complex shape shown in Figure 1 was drawn by the expander and the following program.

```
10 GRAPHIC2,1:COLOR0,7,,,0:SCNCLR
20 FORI=0TO300STEP4
30 CIRCLE1,160,100,I,I,,,I,120
40 NEXT
```

To see how *Super Expander 64* BASIC works, let's take a brief look at this program. First, it clears the screen and makes it entirely black. Next, drawing in yellow, the program makes a small triangle near the center of the screen. (By choosing appropriate parameters, the CIRCLE command can be used to draw squares, ellipses, regular or irregular polygons, triangles, and even straight lines.) It then increases the size of the triangle and draws it again, but tilted slightly to the right. This process is repeated over and over again, until the triangle is much larger—parts of it don't even appear on the screen—and has been turned 300 degrees from its original position. That's all there is to this complex picture.

A Lot For A Little

The language of the expander is not only powerful, it's succinct. It's doubtful whether an equally brief program written in *Simons' BASIC* could produce identical results. On the other hand, once you had written a slightly longer version, *Simons' BASIC* structured programming would enable you to call it by name every time you wanted to use it as part of a longer program. With the expander, you'd be stuck with going to a numbered subroutine.

The expander offers another significant advantage over *Simons' BASIC*. All keywords and parameters may be entered in direct mode—directly from the keyboard, without being in a program. This feature, which can offer distinct advantages to the programmer, is not available in *Simons' BASIC*. As a matter of fact, the entire program we just looked at can be entered in direct mode: The three commands in line 10 are typed in as a unit, then the entire FOR/NEXT loop—all without the need for line numbers.

Graphics Made Easy

The expander's GRAPHIC command offers four types of screen display. In addition to the high-res screen used above, there's a multicolor bitmap mode, a mode for normal text, and a combination of high-res with a five-line text window.

SSHAPE and GSHAPE can pick up sections of the screen display and move them. This is accomplished by transferring the necessary visual information into a string variable and then retrieving it.

CHAR allows easy formatting of text display in all graphics modes. A simple column-row coordinate system allows characters to be placed without the usual trial-and-error methods.

There are many other graphics commands, but they all work in a similar way.

Of course, the *Super Expander 64* offers a lot more than graphics.

The KEY command allows easy programming of the function keys, especially useful considering that expander keywords cannot be abbreviated—they must be typed out in full. KEY can be used to assign any eight keywords to the function keys. There they'll be available at the touch of a key or two. When first turned on, the expander automatically provides one such group of useful words.

Three words, RJOY, RPEN, and RPOT, allow the easy reading of information from joysticks, lightpens, and game paddles. Not only does this considerably simplify the programming of games that use these devices, but also it opens up the possibility of writing serious programs for users

MICRO-SYS DISTRIBUTORS. THE COMMODORE CONNECTION.

commodore

SOFTWARE FOR C-64

Business

Multiplan (Spreadsheet)	$ 63.00
Calc Result (Easy)	$ 45.00
Calc Result (Advanced)	$ 95.00
Superbase 64	$ 95.00
Mirage Concepts (Data Base)	$ 89.00
Mirage Concepts (Word Processor) (40/80 clm & 30K Dictionary)	$ 89.00
Mirage Concepts (Report Generator)	$ 49.00
Home Accountant (Continental)	$ 49.00
Tax Advantage (Continental)	$ 39.00
Southern Solutions Accounting G/L, A/R, A/P, P/R, I/M	each $ 69.95

Utilities

Disk Utility Program (Fast Copy, File Copy, Disassembler & more)	$ 49.00
Smart +64 Terminal	$ 49.00
TOOL 64	$ 39.95
Simon's Basic	$ 39.95
80 Column Expander (Cartridge)	$ 60.00

ACCESSORIES

Solo Flight (Simulator)	$ 34.95
Hellcat Avenger	$ 34.95
Oscar by Databar (Bar Code Reader)	$ 79.95
CBM 1541 (new version)	$ 269.00
Concord Parallel Disk Drive	$ 345.00
Concord Slave Drive	Call
MSD Super Disk (Single)	$ 395.00
MSD Super Disk (Dual)	$ 695.00
1600 Modem	$ 63.00
Vic 1650 Automatic Modem	$ 109.95
Hayes Smart 300 Modem	$ 249.00
Hayes Smart 1200 Modem	$ 629.00
Vic 1530 Datasette	$ 65.00
Cardco Datasette	$ 55.00
5 Slot Expander (64)	$ 65.00
Printer Utility Program (Cardco)	$ 19.95
64 Relay Cartridge	$ 45.00
Numeric Key Pad	$ 49.00
Alien Voice Box (Talks & Sings)	$ 119.00
When I'm 64 (Voice Box Sings)	$ 35.00
Voice Box Dictionary	$ 35.00
Texas Instruments LCD Programmer	$ 55.95
Verbatim Diskettes:	
Single Sided/Single Density	$ 26.00
Single Sided/Double Density	$ 30.00
Double Sided/Double Density	$ 42.00
Vic 20:	
3-Slot Expander	$ 39.00
6-Slot Expander	$ 79.95
16K Memory	$ 79.95
CBM 4023 Ribbons	$ 9.95
CBM 8023 Ribbons	$ 9.95
Flip N' File 10, 15, 25, 50	Call
Power Strips w/surge stopper	Call
Computer Care Kit	$ 19.95
Disk Cleaning Kit	$ 12.95

INTERFACES

Superbox (Transparent IEEE, 3-Slot, Reset)	$ 139.95
Interpod (Intelligent IEEE & RS-232)	$ 139.95
The Connection (By Tymac) (Commodore Graphics + 2K Buffer)	$ 95.00
Cardco +G Parallel Interface	$ 89.00
Vic Switch	$ 149.95
IEEE to Centroonics	$ 149.95
Pet-to-IEEE Cable	$ 39.00
IEEE-to-IEEE Cable	$ 49.00
4 Prong A/V Cable	$ 15.00
Centronics Cable (male to male)	$ 34.95
RS232 Cable (male to male)	$ 31.95
Networking for C-64 & CBM Equipment	Call

MONITORS

CBM 1702 Color Monitor	$ 269.00
Panasonic TR-120 (Green)	$ 142.00
Panasonic TR-120 (Amber)	$ 156.00
Panasonic DT-1300 Color	$ 425.00
Monitor Stand (Tilt & Swivel)	$ 29.95
RGB Monitor Cable:	
ET-100C (Apple)	$ 33.80
ET-101C (IBM)	$ 33.80
Green & Amber Monitors	$ 95.00

LETTER QUALITY PRINTERS

CBM 6400 Printer	$1425.00
Abati (20 CPS)	$ 475.00
Cardco LQ/1 Printer	$ 495.00
NEC Spinwriter	Call

DOT MATRIX PRINTERS

CBM MPS-801 Printer (50cps)	$ 245.00
CBM 4023 (100 CPS)	$ 339.00
CBM 8023 (160 CPS)	$ 565.00
Panasonic KX-P1090 (100 CPS)	$ 285.00
Panasonic KX-P1091 (120 CPS)	$ 325.00
Panasonic KX-P1092 (180 CPS)	Call
Panasonic KX-P1093	Call

COMMODORE BUSINESS MACHINES

Executive 64 Portable	$ 795.00
B128-80 (128K 80 column)	$ 695.00
SuperPet (5 languages)	$1059.00
CBM 8032	$ 595.00
CBM 8096	$ 675.00
CBM 2031 single disk	$ 295.00
CBM 8050 Dual Disk 1 meg.	$ 995.00
CBM 8250 Dual Disk 2 meg.	$1295.00
CBM 9060 Hard Disk/5 Meg.	$2195.00
64K Expansion Board	$ 275.00
SuperPet Upgrade Kit	$ 695.00

BUSINESS SOFTWARE — 8032/8096

Wordpro 4+ or 5+	$ 295.00
Calc Result	$ 199.95
The Manager	$ 199.00
Superbase (8096 only)	$ 225.00
BPI Accounting System 6 Separate Modules	each $ 325.00
Southern Solutions Accounting 5 Separate Modules	each $ 285.00
McTerm Communications Package	$ 175.00

BUSINESS SOFTWARE — B128

Superscript II (40K Dictionary)	$ 199.00
Superbase (Data Base)	$ 199.00
Complete Accounting System (G/L,A/R,A/P,O/E,P/R,I/M)	$ 199.00
Calc Result	$ 199.00

TERMS

Orders under 50.00 add 10.00 Handling fee
MasterCard, VISA, Money Order, Bank Check
COD (add 5.00)
Add 3% For Credit Cards

All Products In Stock Shipped Within 24 Hours

F.O.B. Dallas, Texas
All Products Shipped With Manufacturers
90 Day Warranty

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

DEALERS INQUIRIES WELCOME

Call to Order
1-800-527-1738
All Others Call
1-214-231-2645

Micro-Sys

D I S T R I B U T O R S

641 Presidential Drive • Richardson, Texas 75081 • 9:30 a.m.-6:30 p.m. (Mon.-Fri.) • 10:30 a.m.-2:30 p.m. (Sat.)

who have an aversion to the keyboard. Many people, for example, find pressing the fire button on a joystick more understandable than pressing the RETURN key.

Simplified Sound

The *Super Expander 64* has only three sound keywords—TEMPO, TUNE, and FILTER—but they perform a variety of functions. Like most *Super Expander 64* words, these, too, must be accompanied by parameters. However, sound is so well arranged on the expander that there's initially no need to alter any parameters.

When the computer is first turned on, the expander has already set up ten instrument-like sound forms. These include piano, drum, flute, organ, and six other sounds. For those primarily interested in creating game sounds, the drum sound will be particularly useful.

Playing music and making sound becomes simple. First, the SID chip is turned on by either PRINT CHR$(6); or PRINT"CTRL-F";. Next, sound information is assigned to strings in much the same way that screen information is treated for GSHAPE and SSHAPE. In this case, though, the programmer makes up a string of control numbers and ordinary letters. The strings are then played by simply PRINTing them. That's right, the normal BASIC PRINT command is used by the expander to play music.

To avoid confusion in *Super Expander 64* programs, it's a good idea to reserve the PRINT command for just music and sound, and to use the CHAR command to place characters or text on the screen.

The semicolons next to CHR$(6) and CTRL-F are extremely important. They indicate to the expander that the next suitable characters it finds in a PRINT string are to be treated as sound. Careful use of semicolons will mean that the SID chip needs only to be activated once in a program.

PRINTing CHR$(6) or CTRL-F a second time will shut the SID off; and, of course, there's no need for semicolons when the synthesizer is not active.

Here's an example which illustrates what we've seen so far:

```
PRINT CHR$(6);:PRINT"CDEFGABC":PRINT
CHR$(6)
```

This will play a familiar scale, and can be entered in program or direct mode. If you try it without the semicolon, you'll immediately see why the punctuation must be used.

Programming sound with the *Super Expander 64* is straightforward and a rewarding experience, far less complex than programming sound with *Simons' BASIC*.

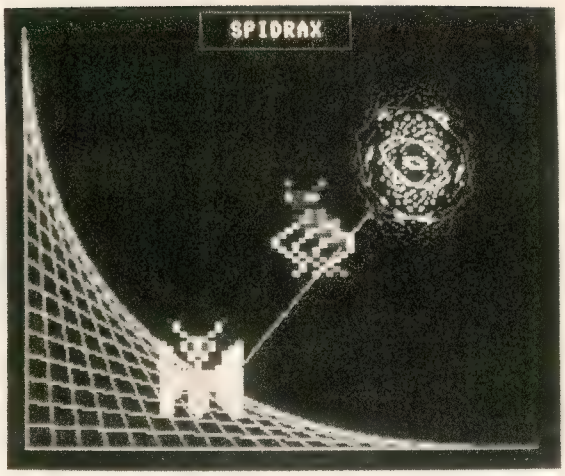


Figure 2

Sprite Programming

The expander offers six keywords for creating sprites. These give complete but simple control over sprite programming. You can specify color, size, and priority, and detect and respond to sprite collisions easily. As usual, there is a string variable system for saving and transferring sprite information. About the only limitation on expander sprites is that they can't be used on a normal text screen.

One of the sprite keywords, SPRDEF, is a good sprite editing program which is built right into the expander. This keyword allows you to define all eight available sprites and put them into memory. You can even define many more than eight sprites and transfer them into strings for later use, filling up your 64 with hundreds of sprite definitions if you want to. And you can use SPRDEF in direct mode to define your sprites before you even start programming.

There is one drawback, though. SPRDEF offers no way to save the sprites it creates so easily. Since a sprite definition is a series of 63 numbers, there's no reason we can't save those numbers. Here's a short program that will display the 63 numbers making up a sprite designed by SPRDEF.

```
5 SN=Ø:REM SN (SPRITE NO.) MUST BE
   THE NO. YOU ENTER IN SPRDEF MODE.
1Ø SPRDEF
2Ø SPRSAVSN,A$
3Ø PRINT "{CLR}"
4Ø FORI=1TO61STEP3
5Ø N$=MID$(A$,I,1):X=ASC(N$):PRINTX,
52 O$=MID$(A$,I+1,1):Y=ASC(O$):PRINTY,
54 P$=MID$(A$,I+2,1):Z=ASC(P$):PRINTZ
6Ø NEXT
```

To use this program, just type it in while the expander is in your computer. Then RUN it. When SPRDEF prompts you, type in 0 (see line 5 of the program). When you're happy with your sprite, press SHIFT RETURN to save it, and then press RETURN to go on with the program. Almost immediately, you'll see the 63 bytes of sprite data appear on your screen. (These numbers are arranged in a format that corresponds to the shape of the sprite.) If you wish, you can copy this information down and use it later. You can rerun this program as many times as you like, but always enter 0 when SPRDEF prompts you.

Once you have the numbers making up a sprite, they can be read back into the machine quite easily. This program shows how this can be done.

```
5 SN=Ø:TH$=CHR$(Ø)
1Ø FORI=1TO63
15 READN
2Ø TH$=TH$+CHR$(N)
3Ø NEXT
4Ø A$=RIGHT$(TH$,63)
5Ø SPRSAVA$,SN
6Ø SPRDEF
```

Sixty-three numbers from your own sprite definition can be appended (starting after line 60) in the form of DATA statements. When RUN, the program will transfer your design into A$ and then into sprite number zero. You'll then return to the SPRDEF mode. Once again, enter 0 and you'll see the sprite you designed.

These two programs could be used repeatedly, by changing sprite numbers and destination strings, to load a large number of sprites into a 64 with the expander inserted, obviously a time-consuming and cumbersome process. The programs are mainly given to show that it is possible to extract sprite data from the *Super Expander 64* environment.

The sprite commands and functions can be combined with the other expander keywords in various creative ways. Figure 2 is typical of results that can be easily achieved.

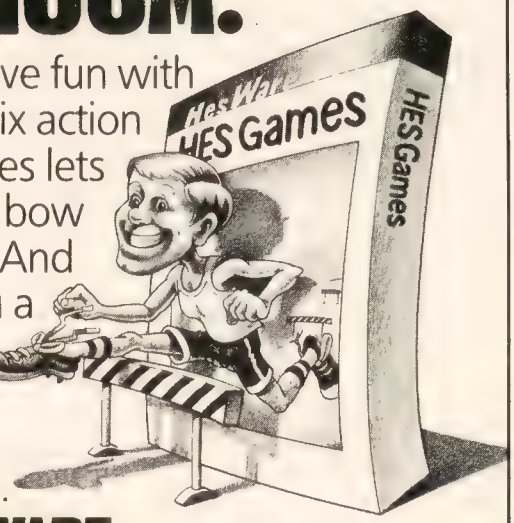
The *Super Expander 64* is a powerful device which frees the programmer from much of the tedium of creating sound and graphics on the 64. Although it invites comparison with *Simons' BASIC*, neither is really competing with the other.

Simons' BASIC performs well in a wide variety of situations, and the *Super Expander 64* is specialized in focus. But if your interest is in sound and graphics, the *Super Expander 64* may be a shortcut to some effective programming.

CHALLENGE THE SOVIET TRACK TEAM TO FIFTY LAPS IN YOUR BEDROOM.

You shouldn't have to jump hurdles to have fun with a computer. Unless it's HesGames. With all six action packed sports games on one disk, HesGames lets you jump, run, dive, lift weights, and shoot a bow and arrow against world class competition. And if you try our HesGames now, we'll give you a free HesGames t-shirt. So come and give HesGames a try. And really experience the thrill of victory or the agony of defeat.

Without ever leaving your own bedroom.



HESGAMES™ BY HESWARE

For the Commodore 64, Apple II and soon for the IBM PC.

Function Key

Willie Brown

The function keys can be extremely useful if you know how to program them. This short utility program for the VIC and 64 allows you to define each function key and save your newly defined keyboard to tape or disk.

Turn your computer on, type some letters, and you'll see them appear on the screen. But press one of the function keys and you'll see nothing. They are mentioned almost in passing in a short paragraph in the User's Guide, which says they can be programmed to perform many different functions. The question is, how do you program them?

The most common method of using the function keys is to set up a GET statement followed by an IF-THEN. The keys can be used in a program to start a game, change the border color, or almost any other function you can think of, as long as you type them in quote mode.

It would be nice, though, if they could be used outside of a program, in direct (or immediate) mode. You might want f1 to LIST the program, f3 to RUN it, f5 to SAVE, and so on—a collection of eight one-stroke commands.

"Function Key" lets you decide how you want to define the keys and use them.

Defining New Functions

After entering the program and SAVEing it, type RUN. A short machine language program is then POKEd into memory. To turn it on, type SYS 52115 (64 version). The entry point for the VIC version will vary depending on how much additional memory you are using; the appropriate SYS number will appear on the screen.

The program is now activated. To assign a value to one of the function keys, type fx=(BASIC command), where x is a number from one to eight and any legal BASIC statement follows the equal sign. Press RETURN and the computer should respond with OK. If you get a SYNTAX ERROR, check the logic of the BASIC line. For example, f1=LIST defines the f1 key as LIST. Any time you type f1, LIST will be printed on the screen. Of course, LIST won't be activated until you press RETURN. To simulate this, add a left arrow (the key directly above CTRL): f1=LIST←.

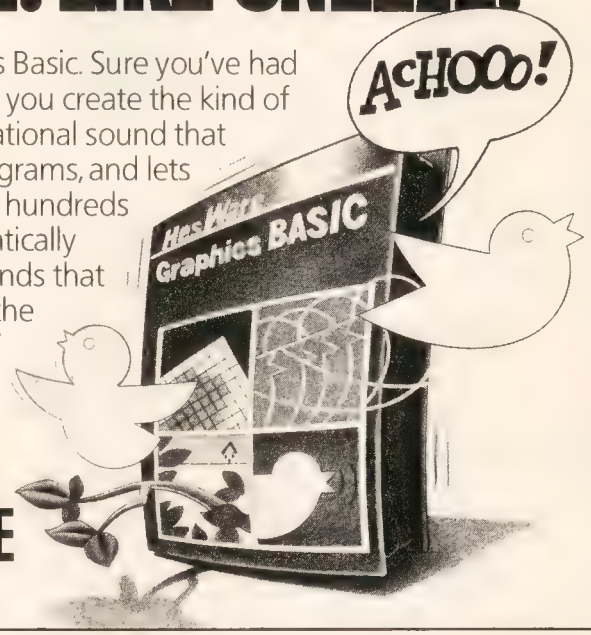
You can define all eight function keys with whatever commands you find most useful. But here are a few items to be noted. First, each key is limited to a maximum of 16 characters. If you exceed the limit, the extra letters will be ignored. Second, if you want a BASIC command to be executed, the last character has to be a left arrow. RUN/STOP–RESTORE resets the computer and will eliminate the function key definitions. Simply use the appropriate SYS to return to "Function Key." Finally, this utility is disabled whenever you run a program. It will work only in immediate mode. This allows you to use the function keys from within your program and still have your favorite commands available with one keystroke while editing the program.

Note that "Function Key" will not work with other programming utilities which use the same locations in memory (in the 64 version, locations 52115 and up).

PROGRAM YOUR COMMODORE TO DO HUNDREDS OF THINGS IT COULD NEVER DO BEFORE. LIKE SNEEZE.

BASIC has never been as elaborate as Graphics Basic. Sure you've had good graphic capabilities before, but never could you create the kind of superlative sprites, complex animation, and sensational sound that you can now. Graphics Basic gives you demo programs, and lets you extend the BASIC language so you can write hundreds of programs and games in no time at all. Automatically move, animate and edit sprites. Add music or sounds that range from laser zaps to sneezes. Or, make half the screen graphics, and half text. And programmers' aides make it simpler and easier to program.

So whether you're a beginner or an expert, the possibilities are endless. Get Graphics Basic. And find out what all the noise is about.



GRAPHICS BASIC™ BY HESWARE

Commodore 64

Wizard of ease.

Easy user.

Letter Wizard is an ideal word processing program for even the most serious wordsmith in your family. It boasts a spelling checker, built-in database manager and compatibility with all popular printers. Nice thing is, commands are a whiz to learn and perform.

Easy writer.

Compose and edit right on the screen. At the stroke of a key, you can move, delete, insert, search and replace words and paragraphs like. . .well, magic.

Easy speller.

Letter Wizard includes a spelling checker which allows easy in-line corrections of over 33,000 words. And you can even create custom dictionaries of your own special words. Have we got you under our spell yet?

Easy buyer.

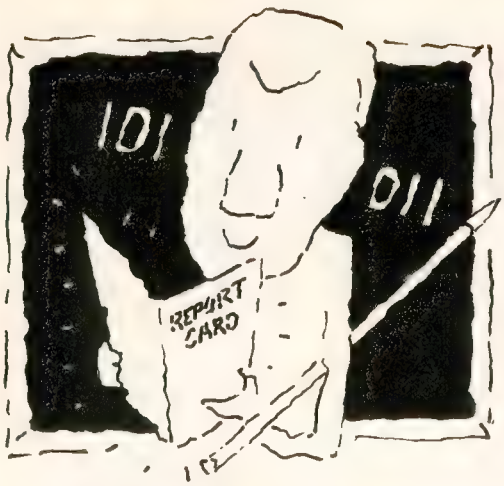
OK, a powerful program like this must cost a powerful lot of money, right? Stuff and nonsense. Even though Letter Wizard offers more than most, it costs less than most. And that's no voodoo.

For Commodore 64, Apple II and Atari systems.

Letter Wizard™ with Spelling Checker by Datasoft®

Datasoft, Inc., 19808 Nordhoff Place, Chatsworth, CA 91311 • (818) 701-5161

Letter Wizard™ is a trademark of Datasoft, Inc.® 1984. © 1984 Datasoft, Inc.



The Visible Computer. The machine language teacher that gets good grades.

Users and experts alike are giving The Visible Computer straight A's for making machine language understandable.

InCider magazine: "TVC is excellent". *Learning Computing:* "Best Educational Software of 1983." *Peelings* magazine: "AA rating ... The explanations are truly excellent, being that rare combination: correct and intelligible." Basic Programmer, Rockford, Illinois: "Wow!".

With The Visible Computer's graphic 6502 simulator, thirty sample programs, and 160 page tutorial-style manual, you'll find that the only mystery about machine language is why no one ever taught it this way before.

The Visible Computer: 6502

Send me The Visible Computer: 6502 for Commodore 64 (requires disk drive). I've enclosed $39.95 plus $2.50 postage and handling.

☐ Check or Money Order ☐ Visa ☐ Mastercard

Name

Address

City/State/Zip

Credit Card No. Exp.

CG

***Software Masters*™**
3330 Hillcroft, Suite BB
Houston, Texas 77057
(713) 266-5771

Creating A Mini-Toolkit

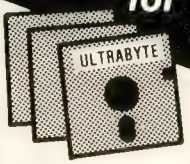
It would be tedious to have to define all eight function keys every time you want to use this utility. You can create your own mini-toolkit with an f9 option, which allows you to save your function key definitions to tape or disk. You can then load your selected functions into memory at the beginning of a programming session.

When you have all the keys defined and want to keep them for future use, type f9=*filename*,8 (for disk) or f9=*filename*,1 (for tape), where *filename* is anything of your choice. But don't put *filename* in quotes. If you want to save another set of function definitions, be sure to use a different filename.

To load the functions back into memory, type LOAD"*filename*",8,1 for disk or LOAD "*filename*",1,1 for tape. The secondary address of 1 is crucial: It tells the computer to load the program into the same area of memory it originally occupied. After the program is loaded, type NEW and then the appropriate SYS. The eight functions you previously saved will be available for use whenever you need them.

See program listing on page 192.

ULTRACOPY 64
Disk Duplication System for Commodore 64



$39.95

plus $3 shipping. Visa or Mastercard. Add $2 for Foreign or COD

- *Simple to use. Menu-driven. Even a beginner makes perfect copies*
- *Analyze disk tracks for data & errors*
- *Skip empty tracks to speed copying*
- *Copy everything incl. DOS flag & false ID*
- *Put errors 20,21,22,23,27 & 29 on copy as required by latest protection schemes*
- *Fast, reliable copying with 1 or 2 drives*

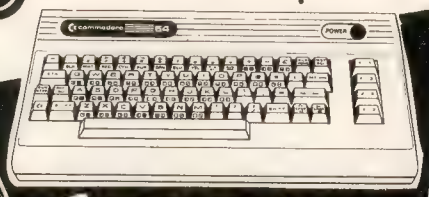
98 % OF SOFTWARE CAN BE ULTRACOPY'ED
BEST COPY PROGRAM YOU CAN BUY

ULTRABYTE Call (313) 562-9855
23400 Michigan, Suite 502, Dearborn, MI 48124
Satisfaction guaranteed, 10 day return privilege
Dealer inquiries invited
Seeking software authors - please write

COMPUTER CENTERS OF AMERICA

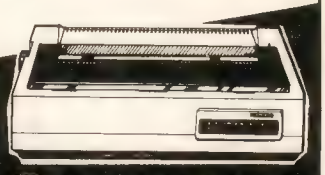
USER FRIENDLY PRICES!
(BELOW WHOLESALE)

commodore
VIC 1541 DISC DRIVE
199.95



commodore
189.95
C-16 & C + 4
IN STOCK!

commodore
1702 MONITOR
199.95



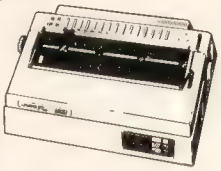
commodore
LETTER-QUALITY PRINTER
219.95

ALL COMPUTERS & COMPUTER PRODUCTS AVAILABLE AT BELOW WHOLESALE PRICES: ATARI • APPLE • IBM • KAYPRO • FRANKLIN

ORDER NOW FOR THE HOLIDAY!

Monitors

NEC	199.95
Pan 1300 RGB & Comp.	289.95
EV 2114 14" Color to Green	189.95
Amdek III	124.95
BMC Green	69.95



Printers

Gemini 10X	239.95
Gemini 15X	399.95
Silver Reed 400	249.95
Silver Reed 500	379.95
Silver Reed 550	409.95
Brother 15X	379.95
Brother 25X	514.95
Juki 6100	399.95
Panasonic 1090	249.95

Interfaces

Star	Call
Tally	Call
Microworld	99.95

Modems

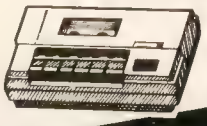
Hayes-300	Call
Hayes-1200	Call
Comm 1650	Call

Diskettes

BASF	13.95
Sentinel Color	16.95
Scotch	14.95
Maxell	14.95

Cassette Recorders

Comm CN-2	59.95
Third Party	39.95



TO ORDER: CALL TOLL FREE—WE'RE PROUD OF OUR PRICES—SATISFACTION GUARANTEED

1-800-631-1003

IN NEW YORK STATE 516/921-5454

COMPUTER CENTERS OF AMERICA

Or Write
Computer Centers of America
31 East Mall
Plainview, NY 11803

Check, Money Order, MC or VISA accepted.
Call for shipping and handling information. NYS residents add applicable sales tax.
All goods are new and include factory warranty. Dealers Welcome!
Prices and availability are subject to change without notice.

VISA
MasterCard

We're Reliable! 18 years of service at these locations: Plainview, Syosset, New Hyde Park, West Hempstead, Huntington, Patchogue

ACCESS
Neutral Zone-D/T	20.95
Spritemaster-D/T	20.95
Beachhead-D/T	20.95
Master Composer-D	23.95

ACCESSORIES
WICO Joysticks	Call
Flip'n'File-D	20.95
Flip'n'File Cart	20.95
Joysensor	Call
WICO Trakball	37.95
KRAFT Joystick	15.95

ATARISOFT
Battlezone-Cart	24.95
Centipede-Cart	24.95
Defender-Cart	24.95
Dig Dug-Cart	24.95
Donkey Kong-Cart	24.95
Galaxian-Cart	24.95
Joust-Cart	24.95
Jungle Hunt-Cart	24.95
Moon Patrol-Cart	24.95
Ms. Pac-Man-Cart	24.95
Pac-Man-Cart	24.95
Pole Position-Cart	24.95
Robotron: 2084-Cart	24.95

CBS SOFTWARE
Argos Expedition-D	29.95
Charles Goren's Bridge-D	54.95
Coco Notes-D	24.95
Ducks Ahoy-D	24.95
Ernie's Magic Shapes-D	24.95
Mastering the SAT-D	104.95
Movie Musical Madness-D	24.95
Murder by the Dozen-D	23.95
Peanut Butter Panic-D	24.95
Sea Horse Hide'n Seek	24.95
Success Decimals (Add/Subt)-D/T	14.95
Success Decimals (Mult/Div)-D/T	14.95
Success Fractions (Add/Subt)-D/T	14.95
Success Fractions (Mult/Div)-D/T	14.95
Timebound-D	24.95
Webster Word Game-D	24.95

COMMODORE
Program Ref. Guide	19.95
Assembler-D	17.95
Easy Finance I,II,III,IV,-D	19.95
Easy Calc-D	64.95
Easy Mail-D	17.95
Easy Script-D	39.95
Easy Spell-D	19.95
Logo-D	49.95
The Manager-D	37.95
General Ledger-D	37.95
Accts. Rec -D	37.95
Accts. Pay -D	37.95
Magic Desk-D	52.95
Zork I, II or III-D	29.95
Suspended-D	29.95
Starcross-D	29.95
Deadline-D	29.95

HESWARE
Super Zaxxon	22.95
64 Forth-Cart	40.95
6502 Profess Dev Sys-T	19.95
Coco-D/T	26.95
Factory-D	22.95
Finance Manager-D	48.95
Ghost Manor/Spike Pk-D	18.95
Graphics Basic-Cart	33.95
HES Cat-D	18.95
HES Font-Cart	15.95
HES Games '84-D	26.95
HES Kit-Cart	33.95
HES Mon-Cart	26.95
HES Writer-Cart	29.95
Microsoft Multiplan-D	68.95
Minnesota Fats' Pool-Cart	19.95
Missing Links-D	19.95
Mr. TNT-Cart	19.95
Omniwriter/Omnispell-D	49.95
Root n' Tootin-Cart	23.95
Synthesound-D	15.95
The Pit-Cart	19.95
Time Money Manager-D	48.95
Turtle Graphics II-Cart	40.95
Turtle Toyland Jr.-D/T	22.95
Type n' Writer-D	19.95
HES Modern	58.95

SPINNAKER
Adventure Creator-Cart	24.95
Aerobics-D	27.95
Aegean Voyage-Cart	24.95
Alf in the Color Caves-C	24.95
Alphabet Zoo-Cart	20.95
Bubble Burst-Cart	24.95
Cosmic Life-Cart	20.95
Delta Drawing-Cart	24.95
Facemaker-Cart	20.95
Fraction Fever-Cart	20.95
Grandma's House-D	20.95
Jukebox-Cart	24.95
Kids on Keys-Cart	20.95
Kidwriter-D	20.95
Kindercomp-Cart	17.95
Ranch-Cart	24.95
Rhymes/Riddles-D	17.95
Search/Amazing Thing-D	24.95
Snooper #1-D	27.95
Snooper #2-D	27.95
Story Machine-Cart	24.95
Trains-D	24.95
Up For Grabs-Cart	24.95

Concorde Third Party Disk Drive for Commodore 64 parallel & serial models available **169.95**

TOUCH TABLETS
Koala Touch Tablet-D	64.95
Koala Touch Tablet-Cart	69.95

Price reductions may have been made since this ad was placed. Call us for our latest price quotes.

DISK AUTO LOAD FOR THE 64

Dan Carmichael, Assistant Editor

Have you ever wanted to type LOAD"*",8,1 and have your favorite program automatically load and run itself like commercial software packages do? "Disk Auto Load" for the 64 will create a program to do just that.

When using commercial programs, you've probably noticed that most automatically load and start the program running without having to enter RUN. The first program loaded into memory is known as a *boot program*. It's this program that loads and executes other programs on the disk.

There are a number of different techniques that can accomplish this, such as overwriting the stack or changing *vectors*. (A vector is a pointer to the starting location of a machine language subroutine.) "Disk Auto Load" uses the latter method.

Manipulating The Vectors

In the Commodore 64, there is an area of unused memory from locations 679 to 767 ($02A7–$02FF). Like the cassette buffer, this 89-byte area is perfect for holding small machine language programs.

Just past this area of memory is a table of important vectors. In the 64, these vectors are two bytes each, using the low-byte/high-byte format. By changing the values of these pointers, you can redirect the system to your own programs.

The vector we'll be using for Disk Auto Load is the *BASIC Warm Start Vector* at 770–771 ($0302–$0303), which points to the main BASIC program loop. This one loop is executed more often than any other routine of BASIC. It checks the keyboard again and again, waiting for input. When a key is pressed, the character is printed on the screen. Pressing RETURN sends this routine into action. It looks at the beginning of the line for a number. If it finds one, it assumes you're writing a program and enters it as a BASIC line. When no line number is found, it executes the statement in immediate mode. After executing the program (or the statement, if there's no number), the computer goes back to the main BASIC program loop, waiting patiently for more from the keyboard.

This vector is also used when loading a program. After a program is loaded into the computer, the system returns to the BASIC program mode by looking at this pointer and going to the BASIC warm start program at 42115 ($A483).

By changing the values in this vector, the computer can be directed to execute a machine language program other than the usual BASIC warm start. In Disk Auto Load, the pointer value is changed by loading a program (which includes the new pointer values) on top of it.

Disk Auto Load puts the automatic boot program into the area from 679–750 ($02A7–$02EE). Before the boot program is saved, the warm start vector is changed to point to the start of the autoboot program at 679 ($02A7). Then the program and the pointer (locations 679–771, $02A7–$0303) are saved to disk as one module.

This becomes our autoboot program. Here's how it works:

The autoboot program (along with the vector with the changed values) is loaded into memory. If it's the first program in the disk's directory, it can be loaded with the LOAD "*",8,1 format. After the LOAD is finished, the computer looks at the BASIC warm start vector. Because the vector now points to the start of the autoboot program (location 679), that program is executed instead of the normal BASIC warm start routine. The autoboot program, in turn, loads in and executes the program you have specified.

BIG BYTES

1301 BOARDMAN-POLAND ROAD, POLAND, OHIO 44514

INFORMATION & IN OHIO ORDER LINE 1 (216) 758-0009
1 (800) 638-2617

CALL FOR PRICES ON ALL NEW COMMODORE PRODUCTS

WORD PROCESSING:
WORD PRO 3 + with speller ..$65
PAPER CLIP 59
with speller 79
MIRAGE CONCEPTS 69
EASY SCRIPT 42
EASY SPELL 18

SPREADSHEETS:
CALC RESULT ADV $69
CALC RESULT EASY 35
MULTIPLAN 69

DATA BASE MANAGERS:
DELPHI'S ORACLE 89
SUPER BASE 64 69
THE MANAGER 37
CODEWRITER 65
MIRAGE CONCEPTS 69

MODEMS:
HES MODEM $47
AUTOMODEM by Westridge ... 79
COMMODORE 1600 59
COMMODORE 1650 89
COMPUSERVE Starter Kit, 5 free hrs 25
MIGHTY MO ..... **CALL FOR PRICES**

MONITORS:
SAKATA SC 100 .....$229
AMDEK COLOR 1 + ... 269
BMC 12" Green (new) 85
TAXAN Green/Amber ... 109-119
COMMODORE 1702 ..... CALL

PRINTERS:
GEMINI 10X/
CARDCO INTERFACE $309
GEMINI 15X 389
POWERTYPE 18 cps
DAISY WHEEL 359
OKIDATA all models ..... CALL
RITEMAN 269
COMMODORE 1526 269
MPS-801 218
CARDCO + G 67
TYMAC CONNECTION 79

DISK DRIVES:
COMMODORE 1541 ..... CALL
MSD SUPER DRIVE ..... CALL
CONCORDE ..... CALL

DATASETTES:
COMMODORE 1530 .....$ 63
PHONEMARK 39

ACCESSORIES:
COMCOOL (disk drive fan) ...$ 49
COMCOOL PLUS
(with surge protector) 69
COVERS, C-64 5
1541-1525-1526-MPS/801 .. 6
GEM 10-X 8
1702 MONITOR 10
MSD DRIVE 6-7

SPECIALS (While Supply Lasts)
CHALKBOARD $29
(With purchase of one software selection at $15. Leo's Links, Music Maestro, Leo's Paint Brush, Bear Jam, Logic Master, Science Programming Kit.)

INFOCOM:
PLANETFALL $28

SEGA:
BUCK ROGERS $19
CONGO BONGO 19
STAR TREK 19

SIERRA-ON-LINE:
HOMEWORD $39

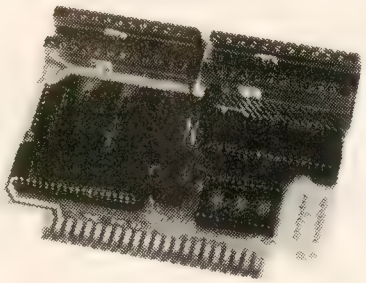
STORAGE:
FLIP 'N FILE 25 .....$14
DISK FILE 70 16
XIDEX DISKETTES, SS/DD 17

HOURS: MON.-FRI., 10 A.M. to 10 P.M.
• SAT., 10 A.M. to 5 P.M.

MOST ORDERS SHIPPED WITHIN 48 HOURS! All prices include cash discount. VISA/MC orders accepted — add 3.5% NO COD ORDERS! For quickest delivery send bank check or money order. Personal or Company checks delay order 21 days. All sales are final — defective merchandise exchanged for same product only. Shipping add 3% ($2.50 minimum). Call for shipping on monitors. Ohio customers add 5.5% sales tax. Prices & availability subject to change. Returns subject to restocking fee. Send $1.00 for our catalog.

CHECK OUR LOW PRICES
BECAUSE OF CONSTANTLY CHANGING PRICES PLEASE CALL & CHECK OUR CURRENT PRICING

NEW!
Universal Input/Output Board for VIC-20/64



- 16 channel 8-bit A/D converter with 100 microsecond sampling time.
- 1 D/A output.
- 16 high voltage/high current discrete outputs.
- 1 EROM socket.
- Use multiple boards for additional channels up to 6 boards.

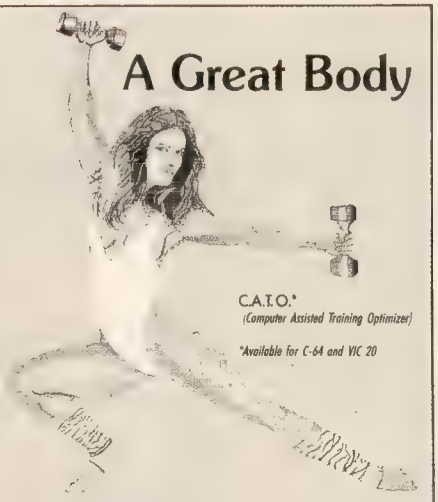
VIC-20 uses MW-311V $205.00
CBM-64 uses MW-311C $225.00

VISA MasterCard

Dealer inquiries invited.

Micro World Electronix, Inc.
3333 S. Wadsworth Blvd. #C105,
Lakewood, CO 80227
(303) 987-9532 or 987-2671

A Great Body



. . . isn't born—it takes training!

And computer assisted training ensures that every minute of work yields maximum results!

These incredibly efficient and *highly personalized* fitness programs using *the latest in U.S. and Soviet training techniques* are now available for your home computer.

BEGINNER OR TRAINED ATHLETE—YOU'LL BENEFIT!

- Calculates an optimal *individualized* exercise program for up to 255 users
- Calculates body fat percentage
- No daily workout repeated in a *90 day cycle.* 132 different exercises—w/wo exercise equipt.
- Graphs progress for each user

For more details about this home computer break-through ask your software dealer or send for brochure

Syntonic CORPORATION

Syntonic Corp., 543 South Fourth West, Missoula, MT 59801

C-64 and VIC-20 are trademarks of Commodore Business Machines, Inc

---

DISK RIOT

BONUS: Purchase 10 or more boxes of disks and earn a 5% discount

5¼" DISKETTES

MAXELL	MD-1	17.99/10
	MD-100 (SS/DD)	28.99/10
	MD-2	27.99/10
	MD-2DD (DS/DD)	42.99/10
VERBATIM (DATALIFE)	SS/DD	21.99/10
	DS/DD	31.99/10
VERBATIM (VEREX)	SS/DD	19.99/10
	DS/DD	27.99/10
DYSAN (with FREE library case)		
	SS/DD	28.99/10
	SS/DD	32.99/10
	DS/DD	38.99/10
	DS/DD	42.99/10
IRISH	SS/DD	14.99/10
	DS/DD	22.99/10
IBM	DS/DD	32.99/10
ULTRA-MAGNETICS (Bonus Package)		
	SS/DD	22.99/12
	DS/DD	32.99/12
ELEPHANT	SS/SD	15.99/10
	SS/DD	16.99/10
3M	SS/DD	18.99/10
	DS/DD	25.99/10

5¼" BULK DISKETTES

With Hub Rings & Envelopes
Certified Error-Free

SS/DD $70./50 $130./100
DS/DD $95./50 $180./100

Disk File for 50 5¼" Diskettes	12.99
Disk File for 75 5¼" Diskettes	15.99
Flip & File/50 with lock	27.99
EZ Filer for 150 5¼" Diskettes	19.99
Library Case for 5¼" Diskettes	1.65

Available in Beige, Gray, Black, Red, or Blue
3M Head Cleaner for 5¼" Disk Drives 24.99
Verbatim Head Cleaner, 5¼" Drives 11.99

COMMODORE 64

Commodore 64	209.99	Easy Calc	54.99
New 1541 Disk	244.99	Manager	38.99
1526 Printer	269.99	Forth 64	34.99
MPS-801 Prntr	218.99	Logo	58.99
1702 Monitor	244.99	Superbase 64	84.99
RS-232 Intrfc	44.99	Diary	26.99
1600 Modem	54.99	Musicalc 1,2,3	99.99
1650 Automodem	84.99	Paperclip	68.99
CP/M Modula	54.99	w/Spellpak	88.99
C2N Datasette	56.99	Mirage Progak	86.99
HES Modem II	89.99	Delphis Oracle	74.99
MSD (Single)	349.99	Multiplan	54.99
MSD (Double)	549.99	Typg Tutor III	39.99
Compuserve	CALL	64 Doctor	22.99
Clone Mchn	44.99	Summer Games	29.99
Super Expndr	34.99	Expansion II	56.95
2-60 Pack	198.99	Flight Simulator II	35.99
COBOL	59.99	Pilot	44.99
FORTRAN	59.99	Songwriter	31.99
VIP Terminal	39.99	Barron's SAT	89.95
Programmer's Reference Guide			14.99
All Atari/Intl Games			29.99

REPLACEMENT PARTS

Heavy Duty Power Supply for Commodore 64 ..... 39.99
I/O Cable for Commodore 64 ..... 14.99
All Other Parts in Stock - Call for Details

JOYSTICKS

WICO Command Control	21.99/ea
WICO 3 Way	22.99/ea
Power Grip	21.99/ea
The Boss	17.99/ea
Kraft Joystick	12.99/ea
Trak Ball	34.99/ea
T.G. Joystick	24.99/ea
Atari Joystick (Original)	7.99/ea
Atari Paddles (Original)	12.49/set
Koala Pad for Commodore (IBDM)	79.99
Koala Pad for Commodore (Disk)	69.99

Call for our Best Prices on Computers, Printers, Monitors, Software, and complete line of accessories for IBM, Apple, Commodore, Atari, and others. Write for our FREE CATALOG. Please add 5% for shipping & handling (Minimum $4.00). NY residents must add proper sales tax. Prices quoted include a discount for cash. Please add 3% for use of MasterCard, Visa or American Express. Due to the fluctuations of the market, all prices are subject to change without notice.

CALL OUR ORDER DESK TOLL-FREE
1-800-255-5905
For information or to order from NY, Alaska, Hawaii call 212-219-2333

BROADWAY COMPUTER CORPORATION
423 Broadway, New York, NY 10013

A Newly Created Program

Enter, save, and run Disk Auto Load. It's a BASIC program which POKEs a machine language program into memory. The machine language program creates the autoboot program, and then saves it to disk.

If you wish to autoboot a program using the LOAD "*",8,1 syntax, format a new disk and don't save any files on it until after you've created the autoboot program. This will ensure that the autoboot program is the first entry in the disk directory.

The first prompt asks if the program you want to be automatically loaded and run is in BASIC or machine language. Press B or M. If you press M for machine language, you are asked to supply the beginning address of the ML program. This is the SYS address that starts the ML program running. Enter a number, then press RETURN.

Next, enter the name of the program you want to be automatically loaded. The program then instructs you to insert a newly formatted disk into the drive. Actually, the disk needs to be freshly formatted only if you wish to use the LOAD "*",8,1 syntax. Saving the autoboot program to a disk that contains other files is fine.

Enter the name you wish to give to the autoboot program you will be creating. For future reference, you might want to indicate in the filename that it's a boot program. For example, if you want to automatically load and run SPACEGAME, you could name the autoboot program SPACEGAME.BOOT.

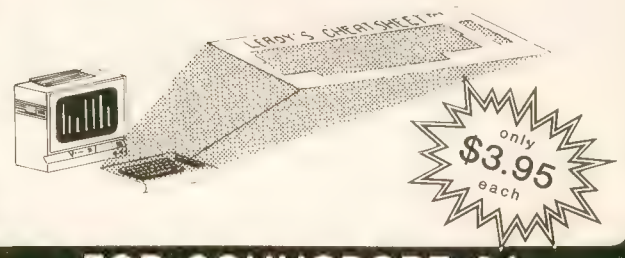
After Disk Auto Load has run and created the autoboot program on the disk, turn off your 64 to reset the system. Be sure to then save a copy of the program you wish to have loaded and run on the same disk as the autoboot program. (It can't load and run a program that isn't there.) Be sure that you save the program with the same filename you told the autoboot program to look for.

To use the autoboot program, type LOAD "*filename*",8,1 where *filename* is the name of the autoboot program you created, *not* the name of the program that autoboot is to load and run. For example, typing LOAD "SPACEGAME.BOOT",8,1 will automatically load and run "SPACEGAME". If everything is in order, the program you specified will automatically run.

If you wish to load and run more than one program, you can write your own boot program. Have Disk Auto Load load and run your program, and it, in turn, will load any programs you want.

See program listing on page 193.

LEROY'S CHEATSHEET™
KEYBOARD OVERLAYS



FOR COMMODORE 64
(VIC-20 also available)

LEROY'S CHEATSHEETS™ are plastic laminated keyboard overlays designed for use with popular software and hardware for Commodore's VIC-20 & C-64 computers.

These cut-it-out yourself overlays are designed to fit over the keyboard surrounding the keys with commands and controls grouped together for easy references.

LEROY'S CHEATSHEETS™
make life easier for you

WORD PROCESSORS
- ☐ EASY SCRIPT
- ☐ HES WRITER
- ☐ PAPER CLIP
- ☐ QUICK BROWN FOX
- ☐ SCRIPT 64
- * ☐ SPEEDSCRIPT (GAZETTE)
- ☐ WORDPRO 3/PLUS

PRINTERS
- ☐ COMMODORE 1525, MPS-801
- ☐ COMMODORE 1526
- ☐ EPSON RX-80
- * ☐ GEMINI 10X

TERMINALS
- ☐ TERM 64
- * ☐ THE SMART 64 Terminal
- * ☐ VIDTEX

LANGUAGES & UTILITIES
- ☐ BASIC
- ☐ HESMON 64
- ☐ LOGO (CBM sheet 1)
- ☐ LOGO (CBM sheet 2)
- ☐ PILOT (CBM)

* NEW

DATA BASES
- ☐ THE CONSULTANT (Delphi's Oracle)
- ☐ MANAGER
- ☐ SUPER BASE 64

SPREADSHEETS
- ☐ CALC RESULT (ADVANCED)
- ☐ CALC RESULT (EASY)
- ☐ EASY CALC
- ☐ MULTIPLAN (HES/MICROSOFT)
- ☐ PRACTICALC 64/PLUS

MISCELLANEOUS
- ☐ BLANKS (3 ea-NOT laminated)
- * ☐ FOR THE BEGINNER
- ☐ SPRITES ONLY

GAZ 11

Qty.___ X $3.95 $ _____
Shipping & handling $ 1.00
6% sales tax $ _____
(PA residents only)
TOTAL $ ___

Dealer inquiries welcome

Name _____
Address _____
City _____ State _____ Zip _____

CHEATSHEET PRODUCTS™
P.O. Box 8299 Pittsburgh, PA 15218
VISA master charge
(412)731-9806

. . . or see your local dealer !

MLX Machine Language Entry Program

For Commodore 64 And VIC-20

Charles Brannon, Program Editor

MLX is a labor-saving utility that allows almost failsafe entry of machine language programs published in COMPUTE!'s GAZETTE. You need to know nothing about machine language to use MLX—it was designed for everyone. There are separate versions for the Commodore 64 and expanded VIC-20 (at least 8K).

MLX is a new way to enter long machine language (ML) programs with a minimum of fuss. MLX lets you enter the numbers from a special list that looks similar to BASIC DATA statements. It checks your typing on a line-by-line basis. It won't let you enter illegal characters when you should be typing numbers. It won't let you enter numbers greater than 255 (forbidden in ML). It won't let you enter the wrong numbers on the wrong line. In addition, MLX creates a ready-to-use tape or disk file. You can then use the LOAD command to read the program into the computer, as with any program:

```
LOAD "filename",1,1   (for tape)
LOAD "filename",8,1   (for disk)
```

To start the program, you enter a SYS command that transfers control from BASIC to machine language. The starting SYS number always appears in the appropriate article.

Using MLX

Type in and save the correct version of MLX for your computer (you'll want to use it in the future). When you're ready to type in an ML program, run MLX. MLX asks you for two numbers: the starting address and the ending address. These numbers are given in the article accompanying the ML program.

You'll see a prompt corresponding to the starting address. The prompt is the current line you are entering from the listing. It increases by six each time you enter a line. That's because each line has seven numbers—six actual data numbers plus a *checksum number*. The checksum verifies that you typed the previous six numbers correctly. If you enter any of the six numbers wrong, or enter the checksum wrong, the computer rings a buzzer and prompts you to reenter the line. If you enter it correctly, a bell tone sounds and you continue to the next line.

MLX accepts only numbers as input. If you make a typing error, press the INST/DEL key; the entire number is deleted. You can press it as many times as necessary back to the start of the line. If you enter three-digit numbers as listed, the computer automatically prints the comma and goes on to accept the next number. If you enter less than three digits, you can press either the SPACE bar or RETURN key to advance to the next number. The checksum automatically appears in inverse video for emphasis.

To simplify your typing, MLX redefines part of the keyboard as a numeric keypad:

```
    U I O                  7 8 9
  H J K L   become 0       4 5 6
    M , .                  1 2 3
```

MLX Commands

When you finish typing an ML listing (assuming you type it all in one session) you can then save the completed program on tape or disk. Follow the screen instructions. If you get any errors while saving, you probably have a bad disk, or the disk is full, or you've made a typo when entering the MLX program itself.

You don't have to enter the whole ML program in one sitting. MLX lets you enter as much as you want, save it, and then reload the file from tape or disk later.

MLX recognizes these commands:

SHIFT-S: Save	**SHIFT-N: New Address**
SHIFT-L: Load	**SHIFT-D: Display**

When you enter a command, MLX jumps out of the line you've been typing, so we recommend you do it at a new prompt. Use the Save command to save what you've been working on. It will save on tape or disk as if you've finished, but the tape or disk won't work, of course, until you finish the typing. Remember what address you stop at. The next time you run MLX, answer all the prompts as you did before, then insert the disk or tape. When you get to the entry prompt, press SHIFT-L to reload the partly completed file into memory. Then use the New Address command to resume typing.

To use the New Address command, press SHIFT-N and enter the address where you previously stopped. The prompt will change, and you can then continue typing. Always enter a New Address that matches up with one of the line numbers in the special listing, or else the checksum won't work. The Display command lets you display a section of your typing. After you press SHIFT-D, enter two addresses within the line number range of the listing. You can abort the listing by pressing any key.

What if you forgot where you stopped typing? Use the Display command to scan memory from the beginning to the end of the program. When you reach the end of your typing, the lines will contain a random pattern of numbers. When you see the end of your typing, press any key to stop the listing. Use the New Address command to continue typing from the proper location.

See program listings on page 194.

How To Type In COMPUTE!'s GAZETTE Programs

Many of the programs which are listed in COMPUTE!'s GAZETTE contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to know exactly what to type when entering one of these programs into your computer, we have established the following listing conventions.

Generally, any VIC-20 or Commodore 64 program listings will contain words within braces which spell out any special characters: {DOWN} would mean to press the cursor down key. {5 SPACES} would mean to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listings. For example, S would mean to type the S key while holding the shift key. This would appear on your screen as a "heart" symbol. If you find an underlined key enclosed in braces (e.g., {10 N}), you should type the key as many times as indicated (in our example, you would enter ten shifted N's).

If a key is enclosed in special brackets, [k], you should hold down the *Commodore key* while pressing the key inside the special brackets. (The Commodore key is the key in the lower left corner of the keyboard.) Again, if the key is preceded by a number, you should press the key as many times as necessary.

Rarely, you'll see a solitary letter of the alphabet enclosed in braces. These characters can be entered on the Commodore 64 by holding down the CTRL key while typing the letter in the braces. For example, {A} would indicate that you should press CTRL-A. You should never have to enter such a character on the VIC-20, but if you do, you would have to leave the quote mode (press RETURN and cursor back up to the position where the control character should go), press CTRL-9 (RVS ON), the letter in braces, and then CTRL-0 (RVS OFF).

About the *quote mode*: You know that you can move the cursor around the screen with the CRSR keys. Sometimes a programmer will want to move the cursor under program control. That's why you see all the {LEFT} s, {HOME}'s, and {BLU}'s in our programs. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote (the double quote, SHIFT-2), you are in the quote mode. If you type something and then try to change it by moving the cursor left, you'll only get a bunch of reverse-video lines. These are the symbols for cursor left. The only editing key that isn't programmable is the DEL key; you can still use DEL to back up and edit the line. Once you type another quote, you are out of quote mode.

You also go into quote mode when you INSerT spaces into a line. In any case, the easiest way to get out of quote mode is to just press RETURN. You'll then be out of quote mode and you can cursor up to the mistyped line and fix it.

Use the following table when entering cursor and color control keys:

When You Read:	Press:	See:
{CLR}	SHIFT CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT ↑ CRSR ↑	
{DOWN}	↑ CRSR ↑	
{LEFT}	SHIFT ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL 9	
{OFF}	CTRL 0	
{BLK}	CTRL 1	
{WHT}	CTRL 2	
{RED}	CTRL 3	
{CYN}	CTRL 4	
{PUR}	CTRL 5	
{GRN}	CTRL 6	
{BLU}	CTRL 7	
{YEL}	CTRL 8	
[1]	C= 1	
[2]	C= 2	
[3]	C= 3	
[4]	C= 4	
[5]	C= 5	
[6]	C= 6	
[7]	C= 7	
[8]	C= 8	
{F1}	f1	
{F2}	SHIFT f1	
{F3}	f3	
{F4}	SHIFT f3	
{F5}	f5	
{F6}	SHIFT f5	
{F7}	f7	
{F8}	SHIFT f7	

The Automatic Proofreader

"The Automatic Proofreader" will help you type in program listings from COMPUTE!'s Gazette without typing mistakes. It is a short error-checking program that hides itself in memory. When activated, it lets you know immediately after typing a line from a program listing if you have made a mistake. Please read these instructions carefully before typing any programs in COMPUTE!'s Gazette.

Preparing The Proofreader

1. Using the listing below, type in the Proofreader. The same program works on both the VIC-20 and Commodore 64. Be very careful when entering the DATA statements — don't type an l instead of a 1, an O instead of a 0, extra commas, etc.

2. SAVE the Proofreader on tape or disk at least twice *before running it for the first time.* This is very important because the Proofreader erases this part of itself when you first type RUN.

3. After the Proofreader is SAVEd, type RUN. It will check itself for typing errors in the DATA statements and warn you if there's a mistake. Correct any errors and SAVE the corrected version. Keep a copy in a safe place — you'll need it again and again, every time you enter a program from COMPUTE!'s Gazette.

4. When a correct version of the Proofreader is RUN, it activates itself. You are now ready to enter a program listing. If you press RUN/STOP-RESTORE, the Proofreader is disabled. To reactivate it, just type the command SYS 886 and press RETURN.

Using The Proofreader

All VIC and 64 listings in COMPUTE!'s Gazette now have a *checksum number* appended to the end of each line, for example ":rem 123". *Don't enter this statement when typing in a program.* It is just for your information. The rem makes the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will confuse the Proofreader, even if you entered the rest of the line correctly.

When you type in a line from a program listing and press RETURN, the Proofreader displays a number at the top of your screen. *This checksum number must match the checksum number in the printed listing.* If it doesn't, it means you typed the line differently than the way it is listed. Immediately recheck your typing. Remember, don't type the rem statement with the checksum number; it is published only so you can check it against the number which appears on your screen.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. But occasionally proper spacing *is* important, so be extra careful with spaces, since the Proofreader will catch practically everything else that can go wrong.

There's another thing to watch out for: if you enter the line by using abbreviations for commands, the checksum will not match up. But there is a way to make the Proofreader check it. After entering the line, LIST it. This eliminates the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way.

Special Tape SAVE Instructions

When you're done typing a listing, you must disable the Proofreader before SAVEing the program on tape. Disable the Proofreader by pressing RUN/STOP-RESTORE (hold down the RUN/STOP key and sharply hit the RESTORE key). This procedure is not necessary for disk SAVEs, *but you must disable the Proofreader this way before a tape SAVE.*

SAVE to tape erases the Proofreader from memory, so you'll have to LOAD and RUN it again if you want to type another listing. SAVE to disk does not erase the Proofreader.

Since the Proofreader is a machine language program stored in the cassette buffer, it will be erased during a tape SAVE or LOAD. If you intend to type in a program in more than one sitting or wish to make a safety SAVE, follow this procedure:

1. LOAD and RUN the Proofreader.
2. Disable it by pressing RUN/STOP–RESTORE.
3. Type the following three lines in direct mode (without line numbers):

```
A$="PROOFREADER.T":B$="{10 SPACES}":FO
RX=1TO4:A$=A$+B$:NEXTX
FORX=886 TO 1018:A$=A$+CHR$(PEEK(X)):N
EXTX
OPEN1,1,1,A$:CLOSE1
```

After you type the last line, you will be asked to press RECORD and PLAY. We recommend you start at the beginning of a new tape.

You now have a new version of the Proofreader (PROOFREADER.T, as renamed in the above code). Turn your computer off and on, then LOAD the program you were working on. Put the cassette containing PROOFREADER.T into the tape unit and type:

OPEN1:CLOSE1

You can now get into the Proofreader by typing SYS 886. To test this, PRINT PEEK (886) should return the number 173. If it does not, repeat the steps above, making sure that A$ (PROOFREADER.T) contains 13 characters and that B$ contains 10 spaces.

The new version of Automatic Proofreader will load itself into the cassette buffer whenever you type OPEN1:CLOSE1 and PROOFREADER.T is the next program on your tape. It will not disturb the contents of BASIC memory.

Automatic Proofreader For VIC And 64

```
100 PRINT"{CLR}PLEASE WAIT...":FORI=886TO
    1018:READA:CK=CK+A:POKEI,A:NEXT
110 IF CK<>17539 THEN PRINT"{DOWN}YOU MAD
    E AN ERROR":PRINT"IN DATA STATEMENTS.
    ":END
120 SYS886:PRINT"{CLR}{2 DOWN}PROOFREADER
     ACTIVATED.":NEW
886 DATA 173,036,003,201,150,208
892 DATA 001,096,141,151,003,173
898 DATA 037,003,141,152,003,169
904 DATA 150,141,036,003,169,003
910 DATA 141,037,003,169,000,133
916 DATA 254,096,032,087,241,133
922 DATA 251,134,252,132,253,008
928 DATA 201,013,240,017,201,032
934 DATA 240,005,024,101,254,133
940 DATA 254,165,251,166,252,164
946 DATA 253,040,096,169,013,032
952 DATA 210,255,165,214,141,251
958 DATA 003,206,251,003,169,000
964 DATA 133,216,169,019,032,210
970 DATA 255,169,018,032,210,255
976 DATA 169,058,032,210,255,166
982 DATA 254,169,000,133,254,172
988 DATA 151,003,192,087,208,006
994 DATA 032,205,189,076,235,003
1000 DATA 032,205,221,169,032,032
1006 DATA 210,255,032,210,255,173
1012 DATA 251,003,133,214,076,173
1018 DATA 003
```

Supertank

(Article on page 64.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

```
10 PRINT"{CLR}{HOME}":RESTORE:V=53248:POK
   EV+32,0:POKEV+33,1:POKEV+17,PEEK(V+17)
   AND247                          :rem 174
15 PRINTTAB(53)"{BLU}{RVS}W*E*L*C*O*M*E!"
   :PRINTTAB(59)"{RED}{RVS}TO"     :rem 147
17 PRINTTAB(55)"{RED}{RVS}SUPERTANK!":PRI
   NT                              :rem 158
20 FORQ=1TO4:PRINTTAB(14)"[5][N]":NEXT
                                   :rem 50
22 PRINTTAB(14)"[N]{RVS}£{8 SPACES}[*]":
   PRINTTAB(14)"{RVS}£ Q Q{2 SPACES}QQQ
   {SPACE}[*]{OFF}[2 I][8 O][3 I]"
                                   :rem 209
24 PRINTTAB(13)"{RVS}£{2 SPACES}Q Q
   {3 SPACES}M{3 SPACES}{OFF}[2 U][8 Y]
   [3 U]"                          :rem 207
26 PRINTTAB(13)"{RVS}{3 SPACES}QQQ
   {2 SPACES}QQQ{2 SPACES}{OFF}"   :rem 79
28 PRINT"{3 SPACES}{RVS}£{30 SPACES}[*]
   {OFF}"                          :rem 103
30 PRINT"{2 SPACES}{RVS}£{32 SPACES}[*]
   {OFF}"                          :rem 96
32 PRINT"{GRN}[2 +][5]{RVS}{34 SPACES}
   {OFF}{GRN}[3 +]"                :rem 236
34 PRINT"[3 +][5]M W{RVS}£ [*]{OFF}W
   {RVS}£ [*]{OFF}W{RVS}£ [*]{OFF}W
   {RVS}£ [*]{OFF}W{RVS}£ [*]{OFF}W
   {RVS}£ [*]{OFF}W{RVS}£ [*]{OFF}WN
   {GRN}[4 +]"                     :rem 255
36 PRINT"[4 +][5]M {RVS} Q {OFF} {RVS} Q
   {SPACE}{OFF} {RVS} Q {OFF} {RVS} Q
   {OFF} {RVS} Q {OFF} {RVS} Q {OFF}
   {RVS} Q {OFF}N{GRN}[5 +]"       :rem 148
38 PRINT"[5 +][5]M[*]{RVS} {OFF}£W[*]
   {RVS} {OFF}£W[*]{RVS} {OFF}£W[*]
   {RVS} {OFF}£W[*]{RVS} {OFF}£W[*]
   {RVS} {OFF}£W[*]{RVS} {OFF}£{GRN}
   [6 +]"                          :rem 31
40 PRINT"[6 +][5][26 Y]{GRN}[7 +]"
                                   :rem 239
42 FORQ=1TO2:PRINT"[39 +]":NEXT    :rem 175
43 GOSUB800                        :rem 127
48 S=54272:FORL=STOS+24:POKEL,0:NEXT
                                   :rem 14
50 PRINT"{CLR}{HOME}{WHT}":POKEV+32,1:POK
   EV+33,0:PRINTTAB(120)           :rem 187
52 GOSUB1000                       :rem 168
60 PRINT"{CLR}{HOME}{WHT}":PRINTTAB(90)"T
   ANK SPECIFICATIONS"             :rem 192
62 PRINTTAB(49)"{RVS}{GRN} STRONG {OFF}
   {3 SPACES}{RVS}{YEL} MEDIUM {OFF}
   {2 SPACES}{RVS}{WHT} WEAK {OFF}"
                                   :rem 65
64 PRINTTAB(40)"{GRN}{RVS}1.TIGER{OFF}
   {4 SPACES}ARMOR{5 SPACES}{YEL}FIRE
   {5 SPACES}{WHT}SPEED"           :rem 30
66 PRINTTAB(40)"{YEL}{RVS}2.T-34{OFF}
   {5 SPACES}{GRN}SPEED{5 SPACES}{YEL}ARM
   OR{4 SPACES}{WHT}FIRE"          :rem 44
68 PRINTTAB(40)"{WHT}{RVS}3.SHERMAN{OFF}
   {2 SPACES}{GRN}FIRE{6 SPACES}{YEL}SPEE
   D{4 SPACES}{WHT}ARMOR":PRINTTAB(120)
                                   :rem 62
70 PRINT:INPUT"{HOME}{15 DOWN}{3 SPACES}W
   HICH TANK DO YOU CHOOSE";TA     :rem 214
72 IFTA<1ORTA>3THEN80              :rem 56
78 PRINT"{4 DOWN}{13 SPACES}GET READY !":
   FORQ=1TO500STEP.5:NEXT:GOTO85   :rem 10
80 PRINT"{HOME}{15 DOWN}{10 SPACES}YOU CA
   N'T DO THAT!{4 SPACES}":GOSUB1300:GOTO
   70                              :rem 210
85 V=53248:GOSUB1100               :rem 130
90 PRINT"{CLR}{HOME}":POKEV+32,0:POKEV+33
   ,1                              :rem 56
92 PRINTTAB(7)"{RVS}[5]£[*]{OFF}
   {4 SPACES}{RVS}£[*]{OFF}{7 SPACES}
   {RVS}£[*]{OFF}{4 SPACES}{RVS}£[*]
   {OFF}{4 SPACES}{RVS}{BLK}SCORE" :rem 1
94 PRINT"{2 SPACES}{RVS}[5]£[*]{OFF}
   {2 SPACES}{RVS}£{2 SPACES}{OFF}
   {3 SPACES}{RVS}£{2 SPACES}[*]{OFF}
   {5 SPACES}{RVS}£{2 SPACES}[*]{OFF}
   {2 SPACES}{RVS}£{2 SPACES}[*]{OFF}
   {2 SPACES}{BLK}";SC             :rem 52
96 PRINT" {RVS}[5]£{2 SPACES}[*]£
   {3 SPACES}[*]{OFF}{2 SPACES}{RVS}
   {4 SPACES}[*]{OFF}{2 SPACES}{RVS}£
   {5 SPACES}{OFF} {RVS}£{4 SPACES}[*]
   {OFF}{2 SPACES}{RVS}{BLK}ARMOR"
                                   :rem 171
98 PRINT"{RVS}[5]£{9 SPACES}[*]£
   {5 SPACES}[*]£{6 SPACES}£{6 SPACES}
   [*]{OFF}{BLK}";AR               :rem 29
```


THE ULTIMATE SPEECH DIGITIZER

Only

$89.95

Complete with headset, microphone, speech synthesis and music software.

Hailed at CES as one of the most innovative consumer electronic products of 1984, the **Voice Master** for 1985 is even better! It is a speech synthesizer that speaks clearly **in your own voice and language**. Now it even measures voice pitch. Music can be written, produced, and taught just by humming a tune! Word recognition software (available separately) allows the computer to respond to your voiced commands. The **Voice Master** has so much potential that it boggles the mind! Applications in games, business, education, and research. Excellent customer support and generous license rights for software authors.

Available for many personal computers. The Commodore 64 version will reproduce speech without any extra hardware. **Voice Master** will make your personal computer, personal.

SEE YOUR DEALER NOW FOR A VOICE MASTER DEMONSTRATION

Or call us at (503) 342-1271 for a **telephone demonstration**. Please include $4.00 shipping/handling when ordering from the factory. Visa, MC, MO, or check. Specify disk or tape. Call or write for further information and receive a **FREE** audio demo tape!

COVOX INC.
675-D Conger St., Eugene, OR 97402
Telex 706017

```
100 FORQ=1TO17:PRINT"{RVS}{GRN}[39 +]":NE
    XT                                  :rem 64
110 PRINT"{RVS}[5][Q]CCCCCCCCC[W]{RIGHT}
    £{13 SPACES}[*]{RIGHT}[Q]CCCCCCCCC
    [W]"                                :rem 65
112 PRINT"{RVS}[5][Q]CCCCCCCCC[W]
    {17 SPACES}[Q]CCCCCCCCC[W]"  :rem 129
114 GOSUB420                            :rem 172
120 CB=1:TI$="000000"                   :rem 34
150 POKEV+21,15:POKE2040,13:POKEV+39,0:PO
    KEV,170:POKEV+1,150:Y=170:X=150:SH=0
                                        :rem 27
151 POKE2042,193:POKEV+41,11:RF=0:UT=110:
    POKEV+42,0:POKE2043,195         :rem 206
152 POKE2041,14:POKEV+40,0:POKEV+2,X1:POK
    EV+3,Y1                             :rem 109
180 S=NOTPEEK(56321)AND15:U=SAND1:D=SAND2
    :L=SAND4:R=SAND8:Y1=0:X1=0      :rem 165
182 POKEV+23,0:POKEV+29,0           :rem 189
185 IFUTHENX=X-M1:IFX<110THENX=X+M1
                                        :rem 253
187 IFDTHENX=X+M1:IFX>180THENX=X-M1
                                        :rem 247
189 IFRTHENY=Y+M1:IFY>245THENY=Y-M1
                                        :rem 14
191 IFLTHENY=Y-M1:IFY<90THENY=Y+M1
                                        :rem 205
200 POKEV,Y:POKEV+1,X                   :rem 59
210 J=NOTPEEK(56321)AND16:IFJ=16THENGOSUB
    245                                 :rem 189
230 BO=BO+.5:GOSUB310:GOTO180       :rem 220
245 SH=SH+1:X1=X:MR=Y:HH=Y/2:GOSUB400
                                        :rem 64
247 FORDD=DDTOHHSTEP5:POKEV+2,DD:POKEV+3,
    X1:GOSUB330:NEXT                :rem 224
250 POKE2041,15:FORDD=DDTOMRSTEP5:POKEV+2
    ,DD:POKEV+3,X1:GOSUB330:NEXT :rem 171
251 IF(PEEK(V+30)AND4)>0THENIF(PEEK(V+30)
    AND4)>0THENGOSUB253             :rem 110
252 X1=0:DD=0:Y1=0:POKEV+2,X1:POKEV+3,MR:
    POKE2041,14:RETURN              :rem 131
253 POKE2041,192:POKEV+23,2:POKEV+29,2
                                        :rem 184
254 POKEV+3,X1-10:POKEV+2,DD-12:GOSUB410:
    GOSUB495                        :rem 204
258 FORRE=1TO500:NEXT:POKEV+23,0:POKEV+29
    ,0                                  :rem 152
260 X1=0:DD=0:Y1=0:POKEV+2,X1:POKEV+3,MR:
    POKE2041,14:RETURN              :rem 130
310 RF=RF+5:IFRF>215THEN350         :rem 95
315 POKEV+4,RF:POKEV+5,UT:RETURN    :rem 79
330 RF=RF+1.8:IFRF>215THENRF=0      :rem 48
333 IFRF=0THEN340                   :rem 243
335 POKEV+4,RF:POKEV+5,UT:RETURN    :rem 81
340 RF=0:UT=110:RS=INT(RND(0)*60):UT=UT+R
    S:GOTO330                       :rem 61
350 F1=RF:F2=UT:POKE2042,194:POKEV+6,F1:P
    OKEV+7,F2:GOSUB400              :rem 77
355 FORQ=F2TO150STEP.4:POKEV+7,Q:NEXT:POK
    EV+29,8:POKEV+23,8:POKEV+6,F1-12
                                        :rem 55
360 F2=150:FORQ=F2TO230STEP.6:POKEV+7,Q:N
    EXT:GOSUB410                    :rem 73
390 POKEV+6,0:POKEV+7,0:POKEV+4,0:POKEV+5
    ,0:RF=0:POKEV+23,0:POKEV+29,0:rem 235
391 POKE2042,193:GOTO499            :rem 118
400 S=54272:FORL=STOS+24:POKEL,0:NEXT:POK
    ES+5,9:POKES+6,16:POKES+24,15 :rem 70
405 POKES+4,129:POKES+1,34:POKES,75:RETUR
    N                                   :rem 91
410 S=54272:FORL=STOS+24:POKEL,0:NEXT:POK
    ES+5,11:POKES+6,16:POKES+24,15
                                        :rem 112
415 POKES+4,129:POKES+1,54:POKES,111:RETU
    RN                                  :rem 133
420 S=54272:FORL=STOS+24:POKEL,0:NEXT:POK
    ES+5,11:POKES+6,56:POKES+24,15
                                        :rem 117
425 POKES+4,129:POKES+1,51:POKES,97:RETUR
    N                                   :rem 96
495 SC=SC+10:CB=0:RN=INT(RND(0)*15):CB=CB
    +RN:GOTO500                         :rem 95
499 AR=AR-1                             :rem 103
500 V=53248:PRINT"{HOME}":POKEV+32,0:POKE
    V+33,CB                             :rem 248
501 RF=0:UT=110:RS=INT(RND(0)*60):UT=UT+R
    S:RF=RF+1.5:                        :rem 211
502 PRINTTAB(7)"{RVS}[5]£[*]{OFF}
    {4 SPACES}{RVS}£[*]{OFF}{7 SPACES}
    {RVS}£[*]{OFF}{4 SPACES}{RVS}£[*]
    {OFF}{4 SPACES}{RVS}{BLK}SCORE"
                                        :rem 45
504 PRINT"{2 SPACES}{RVS}[5]£[*]{OFF}
    {2 SPACES}{RVS}£{2 SPACES}{OFF}
    {3 SPACES}{RVS}£{2 SPACES}[*]{OFF}
    {5 SPACES}{RVS}£{2 SPACES}[*]{OFF}
    {2 SPACES}{RVS}£{2 SPACES}[*]{OFF}
    {2 SPACES}{BLK}";SC                 :rem 96
506 PRINT" {RVS}[5]£{2 SPACES}[*]£
    {3 SPACES}[*]{OFF}{2 SPACES}{RVS}
    {4 SPACES}[*]{OFF}{2 SPACES}{RVS}£
    {5 SPACES}{OFF} {RVS}£{4 SPACES}[*]
    {OFF}{2 SPACES}{RVS}{BLK}ARMOR"
                                        :rem 215
508 PRINT"{RVS}[5]£{9 SPACES}[*]£
    {5 SPACES}[*]£{6 SPACES}£{6 SPACES}
    [*]{OFF}{BLK}";AR                   :rem 73
509 IFAR=0THEN549                   :rem 254
510 RETURN                          :rem 118
549 LL=18:BL=12:BB=15               :rem 169
550 PRINT"{HOME}":POKEV+32,0:POKEV+33,1
                                        :rem 214
558 FORQ=5TO7:PRINTTAB(Q)"{BLK}M"SPC(10)"
    M":NEXT                             :rem 41
560 PRINTTAB(7)"{BLK}N"SPC(11)"M"SPC(4)"N
    M"                                  :rem 29
561 PRINTTAB(6)"N"SPC(13)"M"SPC(2)"N"SPC(
    2)"M"                               :rem 58
562 PRINTTAB(5)"{BLK}N"SPC(15)"{BLK}MN"SP
    C(4)"M"                             :rem 177
563 PRINTTAB(5)"M"SPC(21)"N"SPC(3)"NM"
                                        :rem 142
564 PRINTTAB(6)"M"SPC(6)"NM"SPC(11)"N"SPC
    (3)"N"SPC(2)"M"                     :rem 136
565 PRINTTAB(7)"M"SPC(4)"N"SPC(2)"M"SPC(1
    0)"M"SPC(2)"N"SPC(4)"M"             :rem 52
566 PRINTTAB(8)"M"SPC(2)"N"SPC(4)"M"SPC(1
    0)"MN"SPC(6)"M"                     :rem 139
567 PRINTTAB(9)"MN"SPC(6)"M"SPC(17)"N"
                                        :rem 158
568 PRINTTAB(18)"M"SPC(15)"N":FORLB=1TO6:
    PRINTTAB(LL)"N"SPC(14)"N":LL=LL-1:NEX
    T                                   :rem 60
570 FORQ=1TO5:PRINTTAB(BL)"N"SPC(BB)"M":B
    L=BL-1:BB=BB+2:NEXT                 :rem 187
580 RESTORE:POKEV+23,0:POKEV+29,0:POKEV+2
    1,0:GOSUB420:FORQ=1TO500STEP.1:NEXT
                                        :rem 66
585 S=54272:FORL=STOS+24:POKEL,0:NEXT:GOS
    UB1200                              :rem 193
588 V=53248: BO=BO/10:XX=INT(BO):SC=SC+XX
    :IFSC>HSTHENHS=SC                   :rem 174
```

```
589 PRINT"{HOME}{CLR}":POKEV+32,0:POKEV+3
    3,1:POKE53281,1                  :rem 62
590 PRINTTAB(85)"{RVS}{23}B*O*N*U*S ";XX;S
    PC(3)"{RVS}SHOTS FIRED";SH:PRINTTAB(4
    5)"{RVS}YOUR";                   :rem 201
591 PRINT" SCORE";SC;SPC(3)"{RVS}HIGH SCO
    RE ";HS:PRINTTAB(49)"{RVS}YOUR RANK I
    S {BLK}";B$                      :rem 36
592 PRINTTAB(43)"{RVS}{23}YOUR TOTAL SURVI
    VING TIME ";TI$                  :rem 114
593 PRINTTAB(86)"{RVS}WANT TO PLAY AGAIN?
     (Y/N)"                          :rem 243
595 GETC$:IFC$=""THEN595             :rem 109
596 SC=0:B$="":IFC$="Y"THEN599       :rem 168
597 IFC$="N"THENSYS64738             :rem 164
598 C$="":GOTO595                    :rem 164
599 SH=0:SC=0:BO=0:XX=0:POKEV+32,1:POKEV+
    33,0:GOTO60                      :rem 172
800 S=54272:FORL=STOS+24:POKEL,0:NEXT:POK
    ES+5,9:POKES+6,0:POKES+24,15     :rem 19
801 READHF,LF,DR:IFHF=-1THENRETURN
                                     :rem 196
804 POKES+1,HF:POKES,LF:POKES+4,33:FORT=1
    TODR:NEXT:POKES+4,32:GOTO801     :rem 168
810 DATA18,209,1024,15,210,512,18,209,512
    ,16,195,1024,14,24,512,11,48,512
                                     :rem 45
811 DATA18,209,200,16,195,200,15,210,200,
    14,24,200,15,210,512,22,96,512
                                     :rem 178
812 DATA16,195,1024,11,48,1024,15,210,512
    ,14,24,200,12,143,200,11,48,200
                                     :rem 222
813 DATA10,143,200,11,48,200,12,143,200,1
    1,48,512,16,195,512,14,239,512
                                     :rem 185
814 DATA11,48,512,15,210,200,15,210,200,1
    4,24,200,12,143,200,11,48,200:rem 105
815 DATA10,143,200,11,48,200,12,143,200,1
    1,48,512,16,195,1024,22,96,512
                                     :rem 186
816 DATA18,209,1024,15,210,512,18,209,512
    ,16,195,1024,14,24,512,11,48,512
                                     :rem 51
817 DATA18,209,200,16,195,200,15,210,200,
    14,24,200,15,210,512,22,96,512
                                     :rem 184
818 DATA16,195,1024,11,48,1024,15,210,512
    ,14,24,200,12,143,200,11,48,200
                                     :rem 228
819 DATA10,143,200,11,48,200,12,143,200,1
    1,48,512,16,195,512,14,239,512
                                     :rem 191
820 DATA11,48,512,15,210,200,15,210,200,1
    4,24,200,12,143,200,11,48,200:rem 102
821 DATA10,143,200,11,48,200,12,143,200,1
    1,48,512,11,48,1024,-1,0,0       :rem 210
900 DATA255,255,255,128,24,1,128,24,1,128
    ,24,1,128,24,1,128,24,1,128,24,1
                                     :rem 35
905 DATA128,24,1,128,36,1,128,66,1,255,12
    9,255,128,66,1,128,36,1,128,24,1,128
                                     :rem 1
910 DATA24,1,128,24,1,128,24,1,128,24,1,1
    28,24,1,128,24,1,255,255,255     :rem 93
915 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,0,0,31,254,0,49,255,192,96,255
                                     :rem 88
920 DATA240,196,127,252,206,127,255,206,1
    27,255,196,127,252,96,255,240,49,255
                                     :rem 35
925 DATA192,31,254,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0                        :rem 109
926 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,0,0,63,240,0,103,252,0,195,255
                                     :rem 66
927 DATA0,219,255,192,195,255,0,103,252,0
    ,63,240,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
                                     :rem 207
928 DATA0,0,0,0,0,0,0,0              :rem 113
930 DATA0,0,2,34,128,4,0,64,2,146,128,16,
    0,16,10,73,32,64,0,4,17,140,96,64,0,4
                                     :rem 2
935 DATA17,17,16,64,0,4,8,136,136,64,0,4,
    17,17,16,32,0,8,8,136,128,16,0,16,2,7
    2                                :rem 80
940 DATA128,4,0,64,0,0,0             :rem 184
945 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,64,0,0,
    64,0,0,64,0,0,64,0,0,126,0,0,255,255,
    0                                :rem 221
947 DATA255,0,63,255,252,127,255,254,255,
    255,255,100,68,70,37,85,84,20,68,72
                                     :rem 243
950 DATA15,255,240,0,0,0,0,0,0,0,0,0,0
                                     :rem 228

955 DATA0,2,0,0,2,0,0,2,0,0,2,0,0,58,0,0,
    70,0,0,186,0,0,130,0,0,254,0,1,255,0
                                     :rem 128
960 DATA3,255,128,7,255,192,0,124,0,15,18
    7,224,8,186,32,15,187,224,8,130,32,15
                                     :rem 52
965 DATA131,224,0,0,0,0,0,0,0,0,0 :rem 83
970 DATA0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
    ,0,0,60,0,0,126,0,0,255,0,0,255,0,0
                                     :rem 41
975 DATA126,0,0,60,0,0,0,0,0,0,0,0,0,0,0,
    0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
                                     :rem 178
1000 FORA1=832TO894:READQ1:POKEA1,Q1:NEXT
                                     :rem 22
1010 FORA2=896TO958:READQ2:POKEA2,Q2:NEXT
                                     :rem 38
1015 FORA3=960TO1022:READQ3:POKEA3,Q3:NEX
     T                               :rem 70
1020 FORA4=12288TO12350:READQ4:POKEA4,Q4:
     NEXT                            :rem 226
1025 FORA5=12352TO12414:READQ5:POKEA5,Q5:
     NEXT                            :rem 228
1030 FORA6=12416TO12478:READQ6:POKEA6,Q6:
     NEXT                            :rem 239
1035 FORA7=12480TO12542:READQ7:POKEA7,Q7:
     NEXT                            :rem 241
1090 RETURN                          :rem 170
1100 IFTA=1THENAR=5:IFTA=1THENM1=1
                                     :rem 111
1105 IFTA=2THENAR=3:IFTA=2THENM1=2
                                     :rem 117
1110 IFTA=3THENAR=1:IFTA=3THENM1=3
                                     :rem 114
1150 RETURN                          :rem 167
1200 IFSC=0THENB$="TRAITOR"          :rem 144
1201 IFSC>0ANDSC<51THENB$="SOLDIER"
                                     :rem 138
1202 IFSC>52ANDSC<101THENB$="SERGEANT"
                                     :rem 53
1204 IFSC>101ANDSC<201THENB$="LIEUTENANT"
                                     :rem 3
1206 IFSC>201ANDSC<401THENB$="CAPTAIN"
                                     :rem 15
1208 IFSC>401ANDSC<601THENB$="MAJOR"
                                     :rem 142
```

```
1210 IFSC>601ANDSC<801THENB$="COLONEL"
                                    :rem 30
1212 IFSC>801ANDSC<1001THENB$="* GENERAL
     {SPACE}*"                      :rem 145
1214 IFSC>1001THENB$="** MARSHAL **"
                                    :rem 179
1216 RETURN                         :rem 170
1232 GOTO500                        :rem 150
1300 FORI=1TO1500:NEXT:RETURN        :rem 94
```

Jump!

(Article on page 62.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Jump!—VIC Version

```
3 GOTO2500                          :rem 51
5 CLR:Q=7680:GOSUB1000:N=8 :POKE36879,N:S
  1=36878:S4=36876:POKES1,15:S=0 :rem 175
10 POKE36879,N:W=3:PRINT"{CLR}"   :rem 186
20 A=8131:B=A:M=1:AC=1:A1=7798:A2=7801:Q2
   =1000                            :rem 5
22 PRINT"{CLR}{HOME}{GRN}SC=";L;"{WHT}A
   {GRN}=";W;"EN=";Q2              :rem 146
25 PRINT"{HOME}{21 DOWN}{22 +}";   :rem 47
30 FORX=8164TO8185:POKEX,99:NEXT   :rem 3
40 POKEB,32:POKEA,65:B=A           :rem 161
50 C=PEEK(197):D=PEEK(653):B=A:POKES1,15
                                    :rem 68
51 PRINT"{HOME}{23 SPACES}"         :rem 74
52 Q2=Q2-2:IFQ2<=0THENQ2=0          :rem 29
53 PRINT"{HOME}{PUR}SC=";L;"A=";W;"EN=";Q
   2;""                            :rem 221
54 IFQ2<0THEN480                   :rem 178
55 IFC=34THENA=A+1:GOTO300          :rem 48
60 IFC=33THENA=A-1:GOTO300          :rem 45
65 IFC=32ORC=15ORC=26THENE=A-22:GOTO400
                                   :rem 121
75 IFM>=5THEN90                    :rem 144
80 K=INT(18*RND(0)+7727)            :rem 38
85 POKEK,218:POKEK+1,223:POKEK-1,233
                                    :rem 87
86 IFAC=5THENAC=1:RETURN            :rem 46
87 M=5:GOTO50                        :rem 6
90 O=0:O=INT(64*RND(0)+1)          :rem 124
91 Z=K:M=5                          :rem 69
92 IFK<7728THENAZ=1:GOTO200        :rem 150
93 IFK>7743THENAZ=-1:GOTO200       :rem 195
94 IFO<P1THENQ=K+22:GOTO105        :rem 168
96 IFO>45THENK=K+1:POKEZ,32:POKEZ+1,32:PO
   KEZ-1,32:GOTO85                 :rem 232
97 IFO>25THENK=K-1:POKEZ,32:POKEZ+1,32:PO
   KEZ-1,32:GOTO85                 :rem 233
98 M=5                              :rem 48
99 IFAC=5THENAC=1:RETURN            :rem 50
100 GOTO50                          :rem 47
105 S=128:FORX=QTO8119STEP22:QX=X+22:IFPE
    EK(QX)=65THENPOKEX+22,42:POKE30742+X,
    7:GOTO500                      :rem 163
106 S=S+1:POKES4,S                  :rem 69
107 POKEX,93:NEXT                   :rem 48
108 POKES4,0:S=0:IFPEEK(QX)=90THENB=A:GOT
    O500                            :rem 42
109 POKEQX,93                       :rem 10
110 X=QX+22:T=PEEK(X):IFT=90THENFORX=QTO8
    141:POKEX,32:NEXTX:GOTO500      :rem 83
115 IFT=102THENPOKEX,230:POKEX-22,32
                                   :rem 164
120 IFT=230THENPOKEX,104:POKEX-22,32
                                   :rem 162
125 IFT=104THENPOKEX,32:POKEX-22,32:L=L-2
    5:IFL<=0THENL=0                :rem 192
130 IFT=32THENPOKEX,32:POKEX-22,32:FORF=1
    TO10:NEXT:POKEX,32:POKEX-22,32
                                   :rem 202
155 FORX=QTO8119STEP22:POKEX,32:NEXT
                                    :rem 73
160 IFAC=5THENAC=1:RETURN           :rem 87
165 GOTO50                          :rem 58
200 Z=K:K=K+AZ                      :rem 71
205 POKEZ,32:POKEZ+1,32:POKEZ-1,32:GOTO85
                                   :rem 243
210 POKEK,218:POKEK+1,223:POKEK-1,233
                                   :rem 125
215 M=5:GOTO50                       :rem 47
300 IFD<>0ANDA<8140THENA=A-22:GOTO325
                                   :rem 185
301 AC=5:GOSUB75                   :rem 176
302 IFA<8120THENA=A+1:GOTO75       :rem 149
303 IFA>8141THENA=A-1:GOTO75       :rem 157
305 G=PEEK(A+22)                     :rem 98
310 IFPEEK(A)<>32THEN500           :rem 125
315 IFG=32ORG=104ORG=100THENPOKEA+22,42:P
    OKE30742+A,7:POKEB,32:GOTO500:rem 189
320 Q2=Q2-4:GOTO40                   :rem 16
325 IFA<8098THENA=A+23:GOTO50      :rem 213
326 IFA>8120THENA=A+20:GOTO50      :rem 199
328 Q2=Q2-9:AC=1:IFPEEK(A)<>32THEN500
                                   :rem 149
329 POKEB,32:POKEA,65:B=A          :rem 219
330 IFC=34THENA=A+24               :rem 139
331 IFC=33THENA=A+20               :rem 135
334 IFA<8120THENA=A+2              :rem 188
335 IFA>8141THENA=A-2              :rem 196
340 AC=5:GOSUB75:G=PEEK(A+22)      :rem 183
345 IFPEEK(A)<>32THEN500           :rem 133
350 IFG=32ORG=104ORG=100THENPOKEA+22,42:P
    OKEA+30742,7:POKEB,32:GOTO500:rem 188
352 POKEB,32:POKEA,65:B=A          :rem 215
355 GOTO90                          :rem 63
400 S=255:FORFC=ETO7746STEP-22:S=S-1:POKE
    S4,S:POKEFC,93:NEXTFC          :rem 170
402 POKES4,0                       :rem 168
405 J=FC:H=PEEK(J):IFH=32THEN410 :rem 159
407 GOTO450                        :rem 109
410 POKEJ,93:POKEJ-0,93             :rem 78
415 FORFC=ETO7724STEP-22:POKEFC,32:NEXTFC
                                    :rem 85
420 GOTO75                          :rem 59
450 POKEK,42:POKEK+1,42:POKEK-1,42
                                   :rem 235
455 FORCR=1TO150:NEXT               :rem 58
460 FORI=7724TO7745:POKEI,32:NEXT :rem 17
465 Q2=Q2+25:L=L+50:M=1:U=U+P1:P=INT(U)
                                    :rem 45
470 IFP>25THENP=25                  :rem 66
475 GOTO415                        :rem 115
480 PRINT"{HOME}{10 DOWN}{3 RIGHT}OUT OF
    {SPACE}ENERGY !!":FORX=1TO2500:NEXT
                                   :rem 228
485 PRINT"{CLR}"                     :rem 5
500 FORI=1TO900:NEXT:POKES4,0      :rem 52
502 POKEK,32:POKEK+1,32:POKEK-1,32
                                   :rem 230
```

```
503 FORFC=QTO8119STEP22:POKEFC,32:NEXT
                                  :rem 168
504 W=W-1:IFW>ØTHEN2Ø              :rem 1
505 IFL<1ØTHEN5Ø9                 :rem 223
506 IFL>9ANDL<1ØØTHEN51Ø          :rem 158
507 IFL>99ANDL<1ØØØTHEN511         :rem 9
508 IFL>999THEN512                :rem 40
509 PRINT"{HOME}{9 RIGHT}Ø":GOTO513
                                  :rem 195
51Ø PRINT"{HOME}{1Ø RIGHT}Ø":GOTO513
                                  :rem 216
511 PRINT"{HOME}{11 RIGHT}Ø":GOTO513
                                  :rem 246
512 PRINT"{HOME}{12 RIGHT}Ø"       :rem 8
513 PRINT"{HOME}{1Ø DOWN}{6 RIGHT}GAME OV
    ER!"                          :rem 76
515 FORI=1TO25ØØ:NEXT             :rem 28
517 PRINT"{CLR}"                   :rem 1
52Ø B$="BATTLE AGAIN ?"           :rem 217
525 FORI=1TOLEN(B$):PRINT"{UP}"TAB(4)LEFT
    $(B$,I)                       :rem 23Ø
53Ø FORK=1TO125:NEXT:NEXT         :rem 1Ø1
532 PRINT:PRINT:PRINT             :rem 181
535 B1$="(Y/N)"                   :rem 22Ø
54Ø FORI=1TOLEN(B1$):PRINT"{UP}";TAB(8)LE
    FT$(B1$,I)                    :rem 132
545 FORK=1TO125:NEXT:NEXT         :rem 1Ø7
55Ø FORV=1TO1Ø:GETA$:NEXT          :rem 65
551 GETYN$:IFYN$=""THEN551         :rem 37
555 IFYN$="N"THENEND              :rem 2Ø6
56Ø GOTO5                          :rem 9
1ØØØ PRINT"{CLR}DIFFICULTY LEVELS {DOWN}
     {18 LEFT}{18 T}{DOWN}"       :rem 133
1Ø05 PRINT"{DOWN}1-BEGINNER"       :rem 8Ø
1Ø1Ø PRINT"{DOWN}2-ROOKIE"        :rem 2Ø4
1Ø15 PRINT"{DOWN}3-PRO"           :rem 25Ø
1Ø2Ø PRINT"{DOWN}4-EXPERT"        :rem 222
1Ø25 PRINT"{DOWN}5-RANDOM"        :rem 2Ø5
1Ø3Ø GETDF$:DF=VAL(DF$):IFDF=1THENP1=1Ø
                                  :rem 68
1Ø35 IFDF=2THENP1=12              :rem 161
1Ø4Ø IFDF=3THENP1=14              :rem 16Ø
1Ø45 IFDF=4THENP1=16              :rem 168
1Ø5Ø IFDF=5THENP1=RND(Ø)*16        :rem 52
1Ø55 IFDF<1ORDF>5THEN1Ø3Ø         :rem 226
1Ø6Ø RETURN                       :rem 167
25ØØ POKE36879,8:A$="{PUR}J{3 SPACES}U
     {3 SPACES}M{3 SPACES}P {GRN}"
                                  :rem 129
251Ø PRINT"{CLR}":FORI=1TOLEN(A$)  :rem 6Ø
2512 FORK=1TO155:NEXT              :rem 33
2515 PRINTTAB(4)"{UP}";LEFT$(A$,I):NEXT
                                  :rem 185
252Ø PRINT"{3 DOWN}{3 SPACES}READY TO BAT
     TLE?":PRINT"{2 DOWN}{8 SPACES}{RVS}Y
     {OFF} / {RVS}N{OFF}"          :rem 43
2575 GETY$:IFY$=""THEN2575        :rem 249
258Ø IFY$="N"THENEND              :rem 176
259Ø GOTO5                         :rem 62
```

Program 2: Jump!—64 Version

```
1ØØ GOSUB116Ø                     :rem 217
11Ø CLR:S=54272:LO=54296:GOSUB94Ø:rem 18Ø
12Ø C=PEEK(197):D=PEEK(653)       :rem 249
125 Q$=STR$(Q2)+"{2 SPACES}":IFQ2<=ØTHENQ
    $="Ø{3 SPACES}"               :rem 244
13Ø PRINT"{HOME}{GRN}{3 SPACES}SC = ";L;"
    {2 SPACES}LIVES = ";WW;"{4 SPACES}EN
    {SPACE}= ";Q$                  :rem 23
14Ø IFQ2=<ØTHEN749                 :rem 35
15Ø IF(C=2Ø)AND(A+2+2*D<4Ø)THEN28Ø:rem 78
16Ø IF(C=12)AND(A-2-2*D>-1)THEN3ØØ:rem 73
17Ø IFC=23ORC=1ORC=6ØTHENQ2=Q2-2Ø:GOTO53Ø
                                  :rem 241
18Ø BZ=AZ+INT(55*RND(Ø))-3Ø:T1=SGN(BZ-AZ)
                                  :rem 15Ø
2ØØ IF (AZ-BZ) > (29-P1) THEN 63Ø :rem 7Ø
21Ø IF BZ<3ØORBZ>31Ø THEN 18Ø      :rem 52
22Ø IF T1=1THENA1=AZ:A2=BZ:GOTO24Ø:rem 3Ø
23Ø A1=BZ:A2=AZ                   :rem 1Ø1
24Ø FORI=A1TOA2STEPT1*6           :rem 172
25Ø IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    54:POKEV,I:NEXT:AZ=BZ:GOTO12Ø:rem 231
26Ø POKEV+16,PEEK(V+16)OR1:POKEV,I-256:NE
    XT:AZ=BZ:GOTO12Ø              :rem 54
27Ø M=5:GOTO12Ø                   :rem 94
275 REM MOVE BASE SHIP             :rem 8
28Ø IF D<>ØTHEN39Ø                :rem 226
29Ø A=A+2:B1=BX+16:GOTO32Ø        :rem 213
3ØØ IF D<>ØTHEN46Ø                :rem 217
31Ø A=A-2:B1=BX-16                :rem 2Ø2
32Ø Q2=Q2-5:T1=SGN(B1-BX):IFT1=1THENA1=BX
    :A2=B1:GOTO34Ø                 :rem 68
33Ø A1=B1:A2=BX                    :rem 6Ø
34Ø FORI=A1TOA2STEPT1*4           :rem 171
35Ø IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    53:POKEV+2,I:NEXT:BX=B1:GOTO37Ø
                                   :rem 33
36Ø POKEV+16,PEEK(V+16)OR2:POKEV+2,I-256:
    NEXT:BX=B1                    :rem 1Ø1
37Ø IF PEEK(1904+A)<>32ANDPEEK(1905+A)<>3
    2THEN18Ø                      :rem 227
38Ø W=W-1:GOSUB 733:GOTO 12Ø       :rem 65
385 REM JUMP RIGHT                 :rem 62
39Ø A=A+4:FORI=BXTOBX+16STEP2:Y=Y-2
                                  :rem 192
4ØØ IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    53:POKEV+2,I:POKEV+3,Y:NEXT:GOTO42Ø
                                   :rem 55
41Ø POKEV+16,PEEK(V+16)OR2:POKEV+2,I-256:
    POKEV+3,Y:NEXT                :rem 127
42Ø FORI=BX+16TOBX+32STEP2:Y=Y+2 :rem 24Ø
43Ø IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    53:POKEV+2,I:POKEV+3,Y:NEXT:GOTO45Ø
                                   :rem 61
44Ø POKEV+16,PEEK(V+16)OR2:POKEV+2,I-256:
    POKEV+3,Y:NEXT                :rem 13Ø
45Ø BX=BX+32:IF PEEK(1904+A)<>32ANDPEEK(1
    905+A)<>32THEN18Ø              :rem 29
455 GOSUB 731:GOTO 12Ø            :rem 191
458 REM JUMP LEFT                 :rem 236
46Ø A=A-4:FORI=BXTOBX-16STEP-2:Y=Y-2
                                  :rem 239
47Ø IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    53:POKEV+2,I:POKEV+3,Y:NEXT:GOTO49Ø
                                   :rem 69
48Ø POKEV+16,PEEK(V+16)OR2:POKEV+2,I-256:
    POKEV+3,Y:NEXT                :rem 134
49Ø FORI=BX-16TOBX-32STEP-2:Y=Y+2 :rem 4Ø
5ØØ IF I<256 THEN POKEV+16,PEEK(V+16)AND2
    53:POKEV+2,I:POKEV+3,Y:NEXT:GOTO52Ø
                                   :rem 57
51Ø POKEV+16,PEEK(V+16)OR2:POKEV+2,I-256:
    POKEV+3,Y:NEXT                :rem 128
52Ø BX=BX-32:IF PEEK(1904+A)<>32ANDPEEK(1
    905+A)<>32THEN18Ø              :rem 29
525 GOSUB 731:GOTO 12Ø            :rem 189
53Ø A1=1Ø6:POKES+4,33             :rem 139
54Ø II=Ø:FORI=1784TO1144STEP-4Ø:POKEI+A,A
    1:POKEI+A+S,1:POKES+1,II:II=II+3
                                  :rem 2Ø9
55Ø IFPEEK(V+31)=1THEN CR=1:NEXT:GOTO57Ø
                                  :rem 172
```

```
560 NEXT                                :rem 218
570 POKES+4,32:IF A1=32ANDCR<>1 THEN 180
                                        :rem 198
580 IF CR=1 AND A1=32 THEN 600          :rem 219
590 A1=32:CR=0:GOTO540                  :rem 250
600 POKEV+21,2:T1=INT((AZ-BX)/8)        :rem 89
610 FORI=1104+A+T1TO1104+A+T1+3:POKEI,42:
    POKEI+S,2:NEXTI:GOSUB740            :rem 178
615 FORI=1104+A+T1TO1104+A+T1+3:POKEI,32:
    POKEI+S,2:NEXTI:CR=0                :rem 157
620 L=L+50:Q2=Q2+45:POKEV+21,3:AZ=INT(RND
    (1)*200)+40:POKEV,AZ:GOTO 120       :rem 69
625 REM SHOOT AT BASE                   :rem 190
630 POKES+4,33:II=120:A1=106:T1=INT(AZ/8)
    -2                                  :rem 193
640 FORI=1144TO1864STEP40:POKEI+T1,A1:POK
    EI+S+T1,1:POKES+1,II:II=II-3        :rem 245
650 IF PEEK(V+31)=2THENCR=1:NEXT:GOTO670
                                        :rem 175
660 NEXT                                :rem 219
670 POKES+4,32:IFA1=32THEN 690          :rem 186
680 A1=32:GOTO 640                      :rem 191
690 IF CR=1 THEN GOSUB731:GOTO120:rem 129
710 W=PEEK(1904+T1):IFW=102THENPOKE1904+T
    1,230:GOTO120                       :rem 179
715 W=PEEK(1904+T1):IFW=230THENPOKE1904+T
    1,32:GOSUB740:GOTO120               :rem 223
720 W=PEEK(1944+T1):IFW=102THENPOKE1944+T
    1,32:GOSUB740:GOTO120               :rem 225
730 GOTO 800                            :rem 107
731 REM BASE DESTROYED                  :rem 77
733 POKEV+21,1:POKE1864+A,42:POKE1865+A,4
    2:POKE1864+A+S,2:POKE1865+A+S,2
                                        :rem 139
734 POKES+4,129:POKES+1,90              :rem 244
735 FORI=1TO300:NEXT:POKES+4,128:IF WW=1
    {SPACE}THEN 800                     :rem 122
736 WW=WW-1:POKE1864+A,32:POKE1865+A,32:P
    OKEV+31,0:CR=0                      :rem 240
737 A=0:POKEV+16,PEEK(V+16)AND253:POKEV+2
    1,3                                 :rem 67
738 FORA=0TO32STEP2:IFPEEK(1904+A)<>102OR
    PEEK(1905+A)<>102THENNEXTA          :rem 65
739 BX=A*8+24:POKEV+2,BX:RETURN         :rem 170
740 POKES+4,129:POKES1,30:FORI=1TO50:NEXT
    :POKES+4,128:RETURN                 :rem 21
749 PRINT"{HOME}{10 DOWN}{12 RIGHT}OUT OF
     ENERGY !!":FORX=1TO2500:NEXT:rem 241
750 PRINT"{CLR}"                        :rem 0
760 POKES4,0                            :rem 175
800 POKE53269,0:PRINT"{HOME}{10 DOWN}
    {15 SPACES}GAME OVER"               :rem 74
810 FORI=1TO1500:NEXT                   :rem 25
820 PRINT"{CLR}"                        :rem 254
830 POKEV+21,0:PRINT"{CLR}":B$="
    {5 SPACES}BATTLE AGAIN ?":B1$="
    {3 SPACES}(Y/N)"                    :rem 157
840 FORI=1TOLEN(B$):PRINT"{UP}"TAB(8)LEFT
    $(B$,I)                             :rem 234
850 FORK=1TO125:NEXT:NEXT               :rem 106
860 PRINT:PRINT:PRINT                   :rem 185
870 B1$="{8 SPACES}(Y/N)"               :rem 222
880 FORI=1TOLEN(B1$):PRINT"{UP}";TAB(8)LE
    FT$(B1$,I)                          :rem 139
890 FORK=1TO125:NEXT:NEXT               :rem 110
900 FORV=1TO10:GETA$:NEXT               :rem 64
910 GETYN$:IFYN$=""THEN910              :rem 35
920 IFYN$="N"THENEND                    :rem 202
930 GOTO110                             :rem 103
940 PRINT"{CLR}DIFFICULTY LEVELS{DOWN}
    {17 LEFT}{17 T}{DOWN}"              :rem 33
950 PRINT"{DOWN}1-BEGINNER"             :rem 40
960 PRINT"{DOWN}2-ROOKIE"               :rem 169
970 PRINT"{DOWN}3-PRO"                  :rem 211
980 PRINT"{DOWN}4-EXPERT"               :rem 188
990 PRINT"{DOWN}5-RANDOM"               :rem 167
995 PRINT"{2 DOWN} CHOOSE 1-5"          :rem 238
1000 GETP1$:P1=VAL(P1$)                 :rem 23
1040 IFP1=5THENP1=RND(0)*6              :rem 249
1050 IFP1<1ORP1>5THEN1000               :rem 200
1060 FORI=STOLO:POKEI,0:NEXTI:POKELO,15:P
     OKES+5,130:POKES+6,72              :rem 185
1070 V=53248:POKEV+21,7:POKE2040,13:POKE2
     041,14:POKE2042,14                 :rem 83
1080 POKEV+39,3                         :rem 68
1090 POKE V+28,1:POKEV+37,1:POKEV+38,5:PO
     KEV+39,2:POKEV+40,1:POKEV+4,150
                                        :rem 231
1100 POKE53280,0:POKE53281,0:W=3:PRINT"
     {CLR}"                             :rem 182
1110 A=0:BX=24:B=A:M=1:AC=1:A1=1232:A2=12
     35:Q2=1000:CO=V:AZ=200:B1=BX:Y=205
                                        :rem 18
1120 WW=3:FORX=1904TO1983:POKEX,102:POKEX
     +S,5:NEXTX                         :rem 207
1130 FORX=1984TO2023:POKEX,99:POKEX+S,1:N
     EXT                                :rem 245
1140 POKEV+16,0:POKEV,AZ:POKEV+1,60:POKEV
     +2,BX:POKEV+3,205                  :rem 46
1150 RETURN                             :rem 167
1160 POKE53281,0:POKE53280,0:A$="{PUR}J
     {3 SPACES}U{3 SPACES}M{3 SPACES}P
     {GRN}"                             :rem 51
1200 RESTORE:PRINT"{CLR}{3 DOWN}
     {8 SPACES}J";                      :rem 61
1210 FORK=0TO42:READQ:POKE832+K,Q:NEXT
                                        :rem 133
1220 PRINT"{6 SPACES}U";:FORK=43TO85:READ
     Q:POKE832+K,Q:NEXT                 :rem 95
1230 PRINT"{6 SPACES}M";:FORK=86TO127:REA
     DQ:POKE832+K,Q:NEXT:PRINT"{6 SPACES}
     P"                                 :rem 231
1250 PRINT"{4 DOWN}{11 SPACES}READY TO BA
     TTLE"                              :rem 177
1260 PRINT"{15 SPACES}{RVS}Y{OFF} / {RVS}
     N{OFF}"                            :rem 184
1280 GETY$:IFY$=""THEN1280              :rem 233
1290 IFY$="N"THENEND                    :rem 173
1300 RETURN                             :rem 164
1310 DATA000,000,000,000,000,000,000,000
                                        :rem 147
1320 DATA000,000,000,000,001,085,064,006
                                        :rem 178
1330 DATA190,144,026,190,164,085,085,085
                                        :rem 236
1340 DATA085,085,085,080,020,005,085,085
                                        :rem 230
1350 DATA085,085,085,085,031,235,244,007
                                        :rem 234
1360 DATA235,208,001,085,064,005,000,080
                                        :rem 209
1370 DATA020,000,020,080,000,005,000,000
                                        :rem 170
1380 DATA000,000,000,000,000,000,000,254
                                        :rem 165
1390 REM                                :rem 177
1400 DATA000,000,000,001,000,000,001,000
                                        :rem 149
1410 DATA000,001,000,000,003,128,000,003
                                        :rem 166
1420 DATA128,000,003,128,000,007,192,000
                                        :rem 193
1430 DATA015,224,000,031,240,000,127,252
                                        :rem 193
```

```
1440 DATA000,227,142,000,227,142,000,127
                                    :rem 197
1450 DATA252,000,063,248,000,096,012,000
                                    :rem 202
1460 DATA220,118,000,159,242,000,220,118
                                    :rem 204
1470 DATA000,096,012,000,063,248,000,255
                                    :rem 207
```

Descent To Kaylon

(Article on page 66.)

> **BEFORE TYPING...**
>
> **Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.**

Program 1:

Descent To Kaylon—VIC Version

```
0 POKE56,28:POKE52,28:CLR          :rem 225
1 POKE36869,255:POKE36879,25:PRINT"{BLK}
  {CLR}{RVS}{DOWN}WELCOME TO THE PLANET K
  AYLON":GOTO1202                  :rem 240
6 CL=.:V=36878:POKEV,15:S1=V-1:SR=1
                                    :rem 90
10 PRINT"{CLR}{BLK}":BS=4          :rem 149
20 FORD=7424TO7424+63:READY:POKED,Y:NEXT
                                   :rem 253
22 FORD=1TO6:READNO%(D):NEXT       :rem 252
30 LF=3:PO=7724+21:C=30720         :rem 147
31 TB$="{RVS}**********************"
                                    :rem 49
49 M$(1)=" ":M$(2)="$":CO=(LV+1)/50
                                   :rem 160
50 FORD=1TO3:MA$="":FORAS=1TO22    :rem 107
51 B=1:IFRND(TI)>.9-COTHENB=2      :rem 245
55 MA$=MA$+M$(B):NEXT              :rem 179
56 IFD=1THENA$=MA$                  :rem 47
57 IFD=2THENB$=MA$                  :rem 50
58 IFD=3THENC$=MA$                  :rem 53
59 NEXT                            :rem 173
98 PRINT"{HOME}{RED}{RVS}SCORE{8 SPACES}L
   EFT"                             :rem 42
99 PRINT"{RVS}HIGH{9 SPACES}LEVEL":PRINT"
   {BLK}{RVS}**********************
                                   :rem 248
* 100 PRINT"{HOME}{RED}{5 RIGHT}{RVS}"SC:PR
     INT"{HOME}{RVS}{RED}"TAB(17)LF:PRINT"
     {HOME}{DOWN}{RVS}{BLK}{5 RIGHT}"HI:PR
     INT"{HOME}{DOWN}{RVS}{RED}"TAB(18)LV+
     1                              :rem 23
101 PRINT"{HOME}{BLK}{5 DOWN}"A$;:PRINT"
    {2 DOWN}"B$                    :rem 142
103 PRINT"{PUR}{DOWN}{{3 SPACES}{{{
    {3 SPACES}{{{3 SPACES}{{{{{{{BLK}"
                                    :rem 79
104 PRINT"{DOWN}"C$"{2 DOWN}"A$   :rem 169
105 PRINT"{GRN}{{{"SPC(16)"{{{{{{{"SPC(14
    )"{{{{{{{{{"SPC(12)"{{{{{{{{{{{PUR}
    {RVS}{P}{OFF}{GRN}{";          :rem 108
106 PRINT"{GRN}{{PUR}{RVS}{P}{OFF}{GRN}{{
    {PUR}{RVS}{P}{OFF}{GRN}{{{PUR}{RVS}
    {P}{OFF}{GRN}{{{{{";:POKE8185,33:POKE
    8185+C,5                        :rem 17
185 PRINT"{BLK}";:PO=7724+21       :rem 178
189 FORX=2TO20:POKEPO+X,34:POKEPO+C,CL
                                   :rem 164
190 PRINT"{HOME}{DOWN}{BLK}{DOWN}"LEFT$(T
    B$,X)"{OFF}%{DOWN}{3 LEFT} '{RIGHT}&"
                                    :rem 91
191 FORD=1TO20:P=PEEK(197):IFP=32THEN200
                                   :rem 147
192 NEXT:NEXT:PRINT"{HOME}{2 DOWN}"TAB(X-
    2)"{RVS}*{DOWN}{2 LEFT}{3 SPACES}":GO
    TO189                          :rem 233
200 PO=PO+X:PO=PO+22:POKEPO-22,228:POKEPO
    ,34:POKEPO+C,CL                  :rem 1
219 A$=RIGHT$(A$,21)+LEFT$(A$,1):B$=RIGHT
    $(B$,1)+LEFT$(B$,21)             :rem 5
220 C$=RIGHT$(C$,1)+LEFT$(C$,21):PRINT"
    {HOME}{5 DOWN}"A$;:PRINT"{2 DOWN}"B$:
    PRINT"{4 DOWN}"C$"{2 DOWN}"A$:rem 215
226 M=M+1:IFM>SRTHENM=.:POKEPO,32:PO=PO+2
    2:ON-(PEEK(PO)<>32)GOTO500:POKEPO,34
                                    :rem 60
227 POKEPO+C,CL:OD=PEEK(PO):ON-((OD<>34)A
    ND(OD<>32))GOTO500              :rem 47
230 P=PEEK(197):IFP<>32THEN233    :rem 248
231 M=.:POKES1,200:LS=PEEK(PO+22):CM=(PEE
    K(C+PO+22))AND7                 :rem 39
232 POKEPO+22,35:POKEPO+22+C,2:POKEPO+22,
    LS:POKEPO+22+C,CM:POKES1,.:GOTO219
                                   :rem 100
233 IFP>18THEN219                  :rem 233
234 ON-(P=18)GOTO350               :rem 123
235 ON-(P=17)GOTO300:GOTO219       :rem 133
300 IFPEEK(PO-1)<>32THEN500         :rem 56
302 POKEPO,32:PO=PO-1:POKEPO,34:POKEPO+C,
    CL:GOTO219                     :rem 226
350 IFPEEK(PO+1)<>32THEN500         :rem 59
352 POKEPO,32:PO=PO+1:POKEPO,34:POKEPO+C,
    CL:GOTO219                     :rem 229
500 IFPEEK(PO)>128THEN600          :rem 215
502 POKEV,.:POKES1,200:POKEPO-22+C,2
                                   :rem 134
503 FORD=15TO.STEP-.5:POKEV,D       :rem 50
504 POKEPO-22,219:FORS=.TO20:NEXT:POKEPO-
    22,214:FORS=.TO20:NEXT:NEXT:POKES1,.:
    POKEV,15                       :rem 231
510 FORD=200TO150STEP-.5:POKES1-2,D:NEXT:
    POKES1-2,.:LF=LF-1             :rem 105
511 ON-(LF<=.)GOTO1200:PRINT"{RVS}{HOME}
    {RED}"TAB(17)LF"{BLK}":IFPEEK(PO)=34T
    HENPOKEPO,32                   :rem 57
513 POKEPO-22,32:PRINT"{HOME}{DOWN}{BLK}
    {DOWN}"LEFT$(TB$,X)"{RVS}*{DOWN}
    {3 LEFT}{4 SPACES}":GOTO185    :rem 70
600 POKEPO,34:POKEPO+C,.:BS=BS-1:IFBS=.TH
    ENSC=SC+100:GOTO700            :rem 237
602 SC=SC+100:POKES1-1,200:FORS=0TO200:NE
    XT:POKES1-1,.:PRINT"{HOME}{RIGHT}
    {RVS}{2 RIGHT}{RED}{2 RIGHT}"SC
                                   :rem 109
603 PRINT"{HOME}{DOWN}{BLK}{DOWN}"LEFT$(T
    B$,X)"{RVS}*{DOWN}{3 LEFT}{4 SPACES}"
    :GOTO185                        :rem 28
700 PRINT"{HOME}{RVS}{5 DOWN}{3 RIGHT}BON
    US LEVEL"LV+1"{LEFT}X":Q1=36876:Q2=36
    875:POKEV,15                   :rem 206
702 FORX=1TO6:POKEQ1,NO%(X):POKEQ2,NO%(X)
                                    :rem 36
703 FORT=1TO150:NEXT:IFNO%(X)=235THENFORT
    =.TO200:NEXT                   :rem 131
704 NEXT:POKEQ1,.:POKEQ2,.         :rem 101
710 SC=SC+((LV+1)*100):LV=LV+1:BS=4:FORD=
```

```
    .TO1000:NEXT:PRINT"{CLR}":GOTO31
                                        :rem 0
1000 DATA,,,,,,,                        :rem 15
1002 DATA170,255,255,255,255,255,255,170
                                        :rem 233
1004 DATA24,60,102,126,126,24,36,195
                                        :rem 18
1006 DATA24,36,66,66,36,24,24,0         :rem 33
1008 DATA24,60,126,254,127,60,8,0:rem 127
1010 DATA0,0,0,0,0,0,126,255            :rem 101
1012 DATA170,255,255,255,255,254,252,248
                                        :rem 236
1014 DATA85,255,255,255,255,127,63,31
                                        :rem 88
1015 DATA215,225,231,235,231,235        :rem 78
1200 IFSC>HITHENHI=SC:PRINT"{HOME}{DOWN}
     {5 RIGHT}{RVS}{RED}"HI             :rem 201
1201 PRINT"{CLR}{4 DOWN}{6 RIGHT}{RVS}
     {BLK}GAME OVER"                    :rem 18
1202 PRINT"{DOWN}{RVS}PRESS:{DOWN}":PRINT
     "{RVS}(SPACE) TO RELEASE.{3 SPACES}T
     HEN (SPACE) TO FIRE"               :rem 242
1203 PRINT"{RVS}RETRO-ROCKETS"          :rem 125
1204 PRINT"{RVS}(A)-TO MOVE LEFT
     {6 SPACES}(D)-TO MOVE RIGHT":rem 136
1212 PRINT"{DOWN}{RVS}{2 RIGHT}PRESS ANY
     {SPACE}KEY..."                     :rem 220
1214 POKE198,.:WAIT198,1:GETR$          :rem 241
1215 LV=.:SC=.:M=.:RESTORE:CO=.:GOTO6
                                        :rem 65
```

Program 2:

Descent To Kaylon—64 Version

```
5 POKE53281,13:POKE53280,13:PRINT"{CLR}"C
  HR$(142):POKE52,48:POKE56,48:CLR
                                        :rem 104
10 POKE51,0:POKE55,0                    :rem 129
15 POKE214,12:PRINT:POKE211,3:PRINT"{BLK}
   LOADING CHARACTERS......PLEASE WAIT"
                                        :rem 90
20 POKE56334,PEEK(56334)AND254:POKEl,PEEK
   (1)AND251                            :rem 131
25 FORI=0TO511:POKEI+12288,PEEK(I+53248):
   POKEI+12800,PEEK(I+53760)            :rem 47
30 POKEI+13312,PEEK(I+54272):NEXT:rem 147
35 POKEl,PEEK(1)OR4:POKE56334,PEEK(56334)
   OR1                                  :rem 87
40 FORD=12544TO12544+63:READY:POKED,Y:NEX
   T                                    :rem 93
45 POKE53281,6:POKE53280,12:PRINT"{WHT}
   {CLR}{DOWN}{6 SPACES}{RVS}WELCOME TO T
   HE PLANET KAYLON{5 DOWN}"            :rem 52
50 SD=54272:FORL=SDTOSD+24:POKEL,0:NEXT:P
   OKESD+9,14                           :rem 200
55 POKESD+6,240:POKESD+24,15:HF=SD+1:FL=S
   D:GOTO440                            :rem 25
60 PRINT"{CLR}":CL=0:SR=1:BS=4:POKE53272,
   (PEEK(53272)AND240)OR12              :rem 92
65 LF=3:C=SD                            :rem 190
70 TB$="*********************************
   *********"                           :rem 34
75 M$(1)=" ":M$(2)="$":CO=(LV+1)/50
                                        :rem 159
80 FORD=1TO3:MA$="":FORAS=1TO40         :rem 110
85 B=1:IFRND(TI)>.9-COTHENB=2           :rem 252
90 MA$=MA$+M$(B):NEXT                   :rem 178
95 ONDGOTO100,105,110                   :rem 153
100 A$=MA$:GOTO115                      :rem 239
105 B$=MA$:GOTO115                      :rem 245
110 C$=MA$                              :rem 232
115 NEXT                                :rem 214
118 POKE53280,1:POKE53281,1             :rem 241
120 D$="!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
    !!!!!!!"                            :rem 164
125 PRINT"{HOME}{RED}{RVS}SCORE{OFF}"TAB(
    31)"{RVS}LEFT{OFF}":PRINT"{RVS}HIGH
    {OFF}"TAB(31)"{RVS}LEVEL{OFF}":rem 18
130 PRINT"{BLK}*************************
    **************"                    :rem 245
135 PRINT"{HOME}{RED}"TAB(6)SCTAB(36)LF:P
    RINT"{HOME}{DOWN}"TAB(6)HITAB(36)LV+1
                                        :rem 93
140 PRINT"{HOME}{BLK}{5 DOWN}"A$"{2 DOWN}
    "B$                                 :rem 143
145 PRINT"{PUR}!!!!!!!{2 SPACES}!!!!!!! !!
    !!!!{2 SPACES}!!{2 SPACES}!!!!! !!!!!
    !"                                  :rem 39
150 PRINT"{BLK}{DOWN}"C$"{2 DOWN}"A$:E$="
    {HOME}{20 DOWN}"                    :rem 197
155 PRINTE$"{4}!!!!!"SPC(30)"!!!!!";
                                        :rem 207
160 PRINT"{4}!!!!!!!!!!"SPC(20)"!!!!!!!!!
    !";:PRINT"{4}"D$;                   :rem 240
165 POKE1915,100:POKE1915+C,5:POKE1921,10
    0:POKE1921+C,5:POKE1925,100         :rem 79
170 POKE1925+C,5:POKE1930,100:POKE1930+C,
    5                                   :rem 95
175 PRINT"{BLK}":PO=1144:X=1:D=0        :rem 201
180 X=X+1:IFX>38THEN205                 :rem 114
185 POKEPO+C+X,CL:POKEPO+X,34:PRINT"
    {HOME}{DOWN}{BLK}{DOWN}"LEFT$(TB$,X)"
    {OFF}%{DOWN}{3 LEFT} '{RIGHT}&":GOSUB
    360                                 :rem 132
190 D=D+1:P=PEEK(197):IFP=60THEN210
                                        :rem 23
195 IFD>38THEN180                       :rem 227
200 GOTO190                             :rem 101
205 PRINT"{HOME}{2 DOWN}"TAB(X-1)"*{DOWN}
    {2 LEFT}{5 SPACES}":GOTO175         :rem 218
210 PO=PO+X:PO=PO+40:POKEPO-40,100:POKEPO
    ,34:POKEPO+C,CL                     :rem 247
215 A$=RIGHT$(A$,39)+LEFT$(A$,1):B$=RIGHT
    $(B$,1)+LEFT$(B$,39)                :rem 19
220 C$=RIGHT$(C$,1)+LEFT$(C$,39)        :rem 185
225 PRINT"{HOME}{5 DOWN}"A$;:PRINT"
    {2 DOWN}"B$;:PRINT"{4 DOWN}"C$"
    {2 DOWN}"A$                         :rem 193
230 PK=PEEK(PO):IFPK=35THEN240          :rem 80
235 IFPK<>34ANDPK<>32THEN295            :rem 193
240 M=M+1:IFM>SRTHENM=.:POKEPO,32:PO=PO+4
    0:IFPEEK(PO)<>32THEN295             :rem 18
245 POKEPO,34:POKEPO+C,CL:GOSUB375
                                        :rem 134
250 P=PEEK(197)                         :rem 59
255 IFP=60THENM=.:LS=PEEK(PO+40):LC=PEEK(
    PO+40+C)AND15:GOSUB380:GOTO215
                                        :rem 112
260 IFP=64THEN215                       :rem 229
265 ON-(P=18)GOTO285                    :rem 134
270 ON-(P=10)GOTO275:GOTO215            :rem 132
275 IFPEEK(PO-1)<>32THEN295             :rem 78
280 POKEPO,32:PO=PO-1:POKEPO,34:POKEPO+C,
    CL:GOSUB375:GOTO215                 :rem 60
285 IFPEEK(PO+1)<>32THEN295             :rem 77
290 POKEPO,32:PO=PO+1:POKEPO,34:POKEPO+C,
    CL:GOSUB375:GOTO215                 :rem 59
295 PK=PEEK(PO):IFPK=100THEN325         :rem 136
300 IFPK=33THENPO=PO-40                 :rem 155
305 POKEPO,91:POKEPO+C,0:POKEPO,86:POKEPO
    +C,2:GOSUB365:POKESD+24,15          :rem 191
310 LF=LF-1:ON-(LF=.)GOTO430:PRINT"{HOME}
    {RED}"TAB(36)LF"{RED}"              :rem 50
```

```
315 POKEPO,32                          :rem 248
320 GOSUB355:GOTO175                   :rem 194
325 POKEPO,34:POKEPO+C,.:BS=BS-1:IFBS=0TH
    ENSC=SC+100:GOTO340                :rem 243
330 SC=SC+100:PRINT"{HOME}{RED}"TAB(6)SC
                                       :rem 233
335 GOSUB355:GOTO175                   :rem 200
340 SC=SC+((LV+1)*100):BS=4:PRINT"{HOME}
    {RED}"TAB(6)SC                     :rem 244
345 PRINT"{HOME}{10 DOWN}{40 SPACES}"
                                       :rem 42
346 PRINT"{HOME}{10 DOWN}{13 SPACES}{RVS}
    BONUS LEVEL"LV+1:LV=LV+1           :rem 81
350 FORD=.TO1500:NEXT:PRINT"{CLR}":GOTO75
                                       :rem 141
355 PRINT"{HOME}{DOWN}{BLK}{DOWN}"LEFT$(T
    B$,X)"*{DOWN}{3 LEFT}{4 SPACES}":RETU
    RN                                 :rem 23
360 POKESD+4,17:POKEHF,INT(RND(0)*50)+50:
    POKEFL,250:POKESD+4,16:RETURN:rem 255
365 POKESD+4,129:FORMU=15TO0STEP-1:POKEHF
    ,100:POKESD+24,MU:FORLL=1TO5:NEXT
                                       :rem 233
370 NEXT:POKESD+4,128:RETURN           :rem 25
375 POKESD+4,33:POKEHF,100:POKEFL,250:POK
    ESD+4,32:RETURN                    :rem 210
380 POKEPO+40,35:POKEPO+40+C,2:POKEPO+40,
    LS:POKEPO+40+C,LC:RETURN           :rem 43
385 DATA,,,,,,,                        :rem 238
390 DATA170,255,255,255,255,255,255,170
                                       :rem 194
395 DATA24,60,102,126,126,24,36,195
                                       :rem 238
400 DATA24,36,66,66,36,24,24,0         :rem 238
405 DATA24,60,126,254,127,60,8,0       :rem 79
410 DATA0,0,0,0,0,0,126,255            :rem 56
415 DATA170,255,255,255,255,254,252,248
                                       :rem 194
420 DATA85,255,255,255,255,127,63,31
                                       :rem 40
425 DATA215,225,231,235,231,235        :rem 34
430 IFSC>HITHENHI=SC:PRINT"{HOME}{DOWN}
    {BLK}"TAB(6)HI                     :rem 204
435 PRINT"{CLR}{9 DOWN}{3 RIGHT}
    {12 SPACES}{RVS}{BLK}GAME OVER"
                                       :rem 232
436 PRINT"{DOWN}{15 SPACES}{RVS}{BLK}SCOR
    E"SC                               :rem 51
437 PRINT"{4 DOWN}{12 SPACES}PRESS {RVS}B
    {OFF} TO BEGIN":POKE198,0:GOTO455
                                       :rem 166
440 PRINT"{DOWN} PRESS (SPACE BAR) TO REL
    EASE AND FIRE{3 SPACES}RETRO-ROCKETS.
    "                                  :rem 56
445 PRINT"{DOWN} PRESS (A)-TO MOVE LEFT A
    ND (D)-TO MOVE{2 SPACES}RIGHT."
                                       :rem 235
450 PRINT"{DOWN}{RIGHT}PRESS {RVS}B{OFF}
    {SPACE}TO BEGIN...":POKE198,0      :rem 4
455 GETZ$:IFZ$<>"B"THEN455             :rem 16
460 LV=.:SC=.:M=.:RESTORE:CO=.:GOTO60
                                       :rem 66
465 P=PEEK(197):PRINTP:GOTO465         :rem 108
```

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Bagdad

(Article on page 56.)

Program 1:
Bagdad—VIC Version, Part 1

```
10 PRINT"{CLR}{2 DOWN}"SPC(8)"BAGDAD"
                                       :rem 45
11 PRINT"{4 DOWN}IS THIS ON A {RVS}C{OFF}
   OLOR TV OR {RVS}B{OFF}LACK AND WHITE?"
                                       :rem 43
12 GETG$:IFG$<>"C"ANDG$<>"B"THEN12
                                       :rem 179
13 POKE0,1:IFG$="B"THENPOKE0,0          :rem 1
14 PRINT"{CLR}{DOWN}YOU CONTROL THE GOOD"
   :IFG$="C"THENPRINT"GREEN";:GOTO16
                                       :rem 128
15 PRINT"GREY";                        :rem 169
16 PRINT" GENIE THAT":PRINT"APPEARS AT TH
   E BOTTOM OF THE SCREEN"             :rem 105
17 PRINT"{DOWN}USE JOYSTICK CONTROL
   {2 SPACES}TO MOVE LEFT AND RIGHT"
                                       :rem 30
18 PRINT"PRESSING FIRE BUTTON{2 SPACES}WI
   LL CAUSE YOUR GENIE TO FLY UPWARDS..."
                                       :rem 69
19 PRINT"{DOWN}RELEASING FIRE BUTTON WILL
    CAUSE YOUR GENIE TO FALL DOWNWARDS"
                                       :rem 195
20 PRINT"{DOWN}PUSH THE JOYSTICK
   {5 SPACES}FORWARD TO START A NEWGAME":
   GOSUB29                             :rem 133
21 PRINT"{CLR}{DOWN}YOUR OBJECTIVE IS TO
   {2 SPACES}KNOCK THE BAD GENIES
   {2 SPACES}OFF THEIR MAGIC"          :rem 146
22 PRINT"CARPETS AND BACK INTO THEIR BOTT
   LES"                                :rem 254
23 PRINT"{DOWN}YOU MUST THEN COLLECT THEI
   R BOTTLES BEFORE{2 SPACES}THEY EMERGE
   {SPACE}AGAIN"                       :rem 93
24 PRINT"{DOWN}YOU ONLY SCORE POINTS FOR
   {SPACE}GETTING BOTTLES"             :rem 246
25 PRINT"{DOWN}YOUR GENIE BEGINS WITHFOUR
    LIVES.{2 SPACES}AN EXTRA LIFE IS ADDE
   D FOR"                              :rem 233
26 PRINT"EVERY 4000 POINTS"            :rem 101
27 GOSUB29:PRINT"{CLR}{DOWN}THESE CHARACT
   ERS WILL CHANGE AS THE PROGRAM LOADS"
                                       :rem 58
28 PRINT"{2 DOWN}{5 SPACES}PLEASE WAIT":G
   OTO 32                              :rem 36
29 PRINT"{HOME}{22 DOWN}{6 SPACES}HIT ANY
    KEY{HOME}"                         :rem 142
30 GETG$:IFG$=""THEN30                 :rem 245
31 RETURN                              :rem 68
32 FORI=832TO989:READA:POKEI,A:NEXT:SYS83
   2                                   :rem 193
33 DATA 162,255,154,160,0,185          :rem 144
34 DATA 83,3,153,64,1,200              :rem 193
35 DATA 192,180,208,245,76,66          :rem 161
36 DATA 1,66,67,169,1,162              :rem 211
37 DATA 64,160,1,32,189,255             :rem 53
38 DATA 169,1,162,8,160,0              :rem 202
39 DATA 32,186,255,169,0,170           :rem 106
40 DATA 160,16,32,213,255,169          :rem 143
41 DATA 1,162,65,160,1,32              :rem 189
42 DATA 189,255,169,1,162,8             :rem 60
43 DATA 160,0,32,186,255,169           :rem 100
44 DATA 0,170,160,24,32,213             :rem 30
```

```
45 DATA 255,120,169,0,133,236     :rem 144
46 DATA 133,237,133,238,133,239   :rem 252
47 DATA 133,208,133,209,133,234   :rem 244
48 DATA 169,111,141,15,144,169    :rem 202
49 DATA 255,141,5,144,169,0        :rem 51
50 DATA 141,27,145,169,255,141    :rem 198
51 DATA 20,145,141,21,145,165     :rem 135
52 DATA 162,9,192,133,162,160     :rem 146
53 DATA 1,132,184,132,185,132     :rem 140
54 DATA 186,165,0,240,7,200        :rem 41
55 DATA 200,132,185,200,132,186   :rem 237
56 DATA 160,0,185,0,30,153        :rem 242
57 DATA 0,2,185,0,31,153          :rem 143
58 DATA 0,3,136,208,241,76        :rem 254
59 DATA 30,2                       :rem 73
```

Program 2:

Bagdad—Line Replacement For VIC Tape Users

```
32 FORI=832TO962:READA:POKEI,A:NEXT:SYS83
   2                              :rem 184
33 DATA162,255,154,160,128,185,80,3
                                  :rem 238
34 DATA153,63,1,136,208,247,76,64:rem 144
35 DATA1,169,0,32,189,255,169,1    :rem 43
36 DATA170,160,0,32,186,255,169,0:rem 134
37 DATA170,160,16,32,213,255,169,0
                                  :rem 181
38 DATA170,160,24,32,213,255,120,169
                                   :rem 24
39 DATA0,133,236,133,237,133,238,133
                                   :rem 26
40 DATA239,133,208,133,209,133,234,169
                                  :rem 131
41 DATA111,141,15,144,169,255,141,5
                                  :rem 226
42 DATA144,169,0,141,27,145,169,255
                                  :rem 242
43 DATA141,20,145,141,21,145,165,162
                                   :rem 15
44 DATA9,192,133,162,160,1,132,184
                                  :rem 182
45 DATA132,185,132,186,165,0,240,7
                                  :rem 185
46 DATA200,200,132,185,200,132,186,160
                                  :rem 110
47 DATA0,185,0,30,153,0,2,185     :rem 179
48 DATA0,31,153,0,3,136,208,241    :rem 21
49 DATA76,30,2                    :rem 225
```

Program 3:

Bagdad—VIC Version, Part 2

See instructions in article before beginning.

```
4096 :208,003,076,219,016,201,211
4102 :001,208,003,076,240,016,038
4108 :076,009,017,169,000,133,160
4114 :240,165,242,041,001,201,140
4120 :001,208,004,169,008,133,035
4126 :240,165,241,041,001,201,151
4132 :001,208,007,165,240,024,169
4138 :105,004,133,240,165,240,161
4144 :024,101,243,133,240,070,091
4150 :241,070,242,032,114,016,001
4156 :160,000,165,244,145,003,009
4162 :165,240,145,001,024,105,234
4168 :001,133,240,200,165,244,031
4174 :145,003,165,240,145,001,009
4180 :024,105,001,133,240,160,235
4186 :022,165,244,145,003,165,066
4192 :240,145,001,024,105,001,100
4198 :133,240,200,165,244,145,205
4204 :003,165,240,145,001,096,246
4210 :169,030,133,002,165,241,086
4216 :133,001,164,242,240,016,148
4222 :165,001,024,105,022,133,064
4228 :001,165,002,105,000,133,026
4234 :002,136,208,240,165,001,122
4240 :133,003,165,002,024,105,064
4246 :120,133,004,096,070,241,046
4252 :070,242,032,114,016,160,022
4258 :000,169,032,145,001,200,197
4264 :145,001,160,022,145,001,130
4270 :200,145,001,096,169,000,017
4276 :141,019,145,169,127,141,154
4282 :034,145,173,032,145,041,244
4288 :128,208,002,169,002,133,066
4294 :245,169,255,141,034,145,163
4300 :173,017,145,073,255,041,140
4306 :060,005,245,041,127,074,250
4312 :133,245,096,160,003,169,254
4318 :060,153,117,030,153,120,087
4324 :030,153,029,031,153,048,160
4330 :031,169,061,153,139,030,049
4336 :153,142,030,153,051,031,032
4342 :153,070,031,136,208,225,045
4348 :169,058,153,117,030,153,164
4354 :124,030,153,033,031,153,014
4360 :048,031,192,022,208,001,254
4366 :096,160,022,169,059,208,216
4372 :233,000,160,062,189,002,154
4378 :001,201,041,240,002,160,159
4384 :060,132,204,076,195,023,210
4390 :000,000,165,180,074,074,019
4396 :168,185,184,000,160,022,251
4402 :145,003,096,133,235,230,124
4408 :233,216,169,009,032,009,212
4414 :019,169,062,160,045,153,158
4420 :205,031,136,208,250,164,038
4426 :233,240,008,169,037,136,129
4432 :153,229,031,208,250,169,096
4438 :038,141,236,031,169,039,228
4444 :141,243,031,160,004,185,088
4450 :234,000,074,074,074,074,116
4456 :024,105,040,153,235,031,180
4462 :185,234,000,041,015,024,097
4468 :105,040,153,236,031,185,098
4474 :235,000,074,074,074,074,141
4480 :024,105,040,153,242,031,211
4486 :185,235,000,041,015,024,122
4492 :105,040,153,243,031,136,080
4498 :136,208,204,169,040,141,020
4504 :248,031,141,241,031,096,172
4510 :169,064,044,029,145,240,081
4516 :251,173,020,145,169,096,250
4522 :141,021,145,169,000,133,011
4528 :210,165,208,240,023,197,195
4534 :209,048,019,133,209,169,201
4540 :000,160,005,132,210,136,063
4546 :153,010,144,208,250,169,104
4552 :015,141,014,144,169,000,171
4558 :133,208,165,209,201,002,100
4564 :240,015,201,003,240,035,178
4570 :201,005,240,070,201,006,173
4576 :240,095,076,089,018,165,139
4582 :210,240,004,169,236,133,198
4588 :212,198,212,165,212,141,096
4594 :011,144,201,232,208,004,018
4600 :169,000,133,209,096,165,252
4606 :210,240,008,169,005,133,251
```

```
4612 :212,169,232,133,213,165,104
4618 :213,201,232,208,013,198,051
4624 :212,208,005,169,000,133,231
4630 :209,096,169,240,133,213,058
4636 :198,213,165,213,141,012,202
4642 :144,096,165,210,240,004,125
4648 :169,210,133,212,165,212,117
4654 :141,012,144,230,212,165,182
4660 :212,141,010,144,201,240,232
4666 :208,004,169,000,133,209,013
4672 :096,165,210,240,004,169,180
4678 :230,133,212,230,212,165,228
4684 :212,141,012,144,201,250,012
4690 :208,004,169,000,133,209,037
4696 :096,201,007,240,019,201,084
4702 :008,240,042,201,009,240,066
4708 :124,201,010,240,058,201,166
4714 :011,240,078,076,000,019,018
4720 :165,210,240,009,169,015,152
4726 :133,212,169,220,141,011,236
4732 :144,165,212,141,014,144,176
4738 :198,212,208,004,169,000,153
4744 :133,209,096,165,210,240,165
4750 :004,169,220,133,212,198,054
4756 :212,165,212,141,013,144,011
4762 :201,188,208,004,169,000,156
4768 :133,209,096,165,210,240,189
4774 :004,169,208,133,212,198,066
4780 :212,165,212,141,013,144,035
4786 :201,127,208,004,169,000,119
4792 :133,209,096,165,210,240,213
4798 :009,169,205,133,212,056,206
4804 :233,010,133,213,230,213,204
4810 :165,213,141,012,144,197,050
4816 :212,240,001,096,230,212,175
4822 :165,212,201,240,208,231,191
4828 :169,000,133,209,096,165,224
4834 :210,240,004,169,144,133,102
4840 :212,230,212,165,212,041,024
4846 :011,024,101,212,141,012,227
4852 :144,165,212,201,240,208,134
4858 :004,169,000,133,209,096,093
4864 :160,005,136,153,010,144,096
4870 :208,250,096,197,208,048,245
4876 :002,133,208,096,230,160,073
4882 :164,160,177,161,042,109,063
4888 :017,145,042,229,212,042,199
4894 :069,227,042,005,240,042,143
4900 :109,004,144,234,096,133,244
4906 :195,201,016,240,249,048,223
4912 :051,230,193,165,193,201,057
4918 :042,048,004,169,000,133,194
4924 :193,074,133,241,165,194,036
4930 :074,133,242,032,114,016,165
4936 :160,001,177,001,201,051,151
4942 :176,008,160,023,177,001,111
4948 :201,050,144,011,169,014,161
4954 :133,195,169,002,032,009,118
4960 :019,198,193,096,198,193,225
4966 :016,004,169,041,133,193,146
4972 :165,193,074,133,241,165,055
4978 :194,074,133,242,032,114,135
4984 :016,160,000,177,001,201,163
4990 :051,176,008,160,022,177,208
4996 :001,201,050,144,011,169,196
5002 :018,133,195,169,002,032,175
5008 :009,019,230,193,096,133,056
5014 :196,201,016,240,249,048,076
5020 :042,230,194,165,193,074,030
5026 :133,241,165,194,074,133,078
5032 :242,032,114,016,160,022,242
5038 :177,001,201,051,176,007,019
5044 :200,177,001,201,050,144,185
5050 :011,169,014,133,196,169,110
5056 :002,032,009,019,198,194,134
5062 :096,198,194,048,028,165,159
5068 :193,074,133,241,165,194,180
5074 :074,133,242,032,114,016,053
5080 :160,000,177,001,201,051,038
5086 :176,007,200,177,001,201,216
5092 :050,144,011,169,018,133,241
5098 :196,169,002,032,009,019,149
5104 :230,194,096,234,234,234,182
5110 :165,224,240,003,076,197,127
5116 :020,165,225,133,241,133,145
5122 :193,165,226,133,242,133,070
5128 :194,032,154,016,198,230,064
5134 :208,071,165,227,032,041,246
5140 :019,165,193,133,225,165,152
5146 :195,133,227,032,178,016,039
5152 :169,008,036,245,240,012,230
5158 :164,227,192,012,048,006,175
5164 :198,227,169,000,133,229,232
5170 :169,001,036,245,240,012,241
5176 :164,227,192,021,016,006,170
5182 :230,227,169,016,133,229,042
5188 :165,227,201,016,048,008,221
5194 :169,023,056,229,227,076,086
5200 :085,020,056,233,009,133,104
5206 :230,198,231,208,060,165,154
5212 :228,032,149,019,165,194,111
5218 :133,226,165,196,133,228,155
5224 :032,178,016,169,016,036,039
5230 :245,240,011,164,228,192,166
5236 :012,048,013,198,228,076,179
5242 :132,020,164,228,192,021,111
5248 :016,002,230,228,165,228,229
5254 :201,016,048,008,169,023,087
5260 :056,229,228,076,149,020,130
5266 :056,233,009,133,231,165,205
5272 :225,133,241,165,226,133,251
5278 :242,165,229,133,243,169,059
5284 :005,133,244,032,015,016,097
5290 :169,016,036,245,240,005,113
5296 :169,001,032,009,019,032,182
5302 :080,026,144,003,076,200,199
5308 :027,096,000,000,000,000,055
5314 :000,000,000,198,224,165,013
5320 :224,016,007,169,002,133,239
5326 :225,133,226,096,201,127,190
5332 :208,005,169,010,032,009,133
5338 :019,165,224,201,122,048,229
5344 :035,169,226,141,172,031,230
5350 :169,251,141,173,031,169,140
5356 :062,141,194,031,169,225,034
5362 :141,195,031,169,001,141,152
5368 :172,151,141,173,151,141,153
5374 :194,151,141,195,151,096,158
5380 :201,121,208,005,169,011,207
5386 :032,009,019,041,001,024,136
5392 :105,005,141,172,151,141,219
5398 :173,151,141,194,151,141,205
5404 :195,151,234,234,234,234,030
5410 :160,008,140,172,031,200,233
5416 :140,173,031,200,140,194,150
5422 :031,200,140,195,031,165,040
5428 :224,240,007,032,178,016,237
5434 :041,025,240,030,169,000,051
5440 :133,224,133,209,133,208,080
```

```
5446 :169,020,133,225,169,039,057
5452 :133,226,169,016,133,227,212
5458 :133,228,169,000,133,229,206
5464 :169,001,133,230,133,231,217
5470 :096,000,000,000,000,000,190
5476 :000,000,000,000,151,169,164
5482 :006,056,229,234,141,194,198
5488 :151,141,195,151,076,189,247
5494 :020,230,232,032,178,016,058
5500 :041,025,208,003,076,189,154
5506 :020,169,000,076,038,021,198
5512 :000,000,000,162,000,134,176
5518 :180,189,000,001,201,001,202
5524 :240,003,076,029,022,165,171
5530 :178,197,180,240,003,076,004
5536 :195,023,165,179,240,005,199
5542 :198,179,076,195,023,032,101
5548 :016,019,041,003,133,176,048
5554 :169,000,133,183,165,176,236
5560 :010,168,185,248,027,133,187
5566 :181,185,249,027,133,182,123
5572 :160,000,169,032,209,181,179
5578 :208,062,200,200,209,181,238
5584 :208,056,200,200,209,181,238
5590 :208,050,152,024,105,040,025
5596 :168,192,132,208,229,160,029
5602 :112,177,181,201,051,144,068
5608 :033,165,176,010,168,185,201
5614 :240,027,157,001,001,185,081
5620 :241,027,157,002,001,254,158
5626 :000,001,230,178,169,080,140
5632 :133,179,169,005,032,009,015
5638 :019,076,022,017,230,176,034
5644 :165,176,041,003,133,176,194
5650 :230,183,165,183,201,004,216
5656 :208,156,076,195,023,201,115
5662 :002,208,095,254,008,001,086
5668 :189,001,001,133,241,189,022
5674 :002,001,133,242,169,000,077
5680 :133,243,165,180,074,074,149
5686 :168,185,184,000,133,244,200
5692 :032,015,016,169,007,145,188
5698 :003,165,204,145,001,136,208
5704 :145,001,169,007,145,003,030
5710 :189,008,001,041,001,240,046
5716 :003,076,195,023,222,002,093
5722 :001,189,008,001,201,004,238
5728 :208,243,254,000,001,169,203
5734 :016,157,003,001,157,004,184
5740 :001,032,016,019,041,016,233
5746 :157,005,001,169,001,157,092
5752 :006,001,157,007,001,076,112
5758 :195,023,201,004,240,003,024
5764 :076,109,023,189,001,001,019
5770 :074,133,241,189,002,001,010
5776 :074,133,242,198,242,032,041
5782 :114,016,189,002,001,041,001
5788 :001,240,021,160,022,169,001
5794 :034,145,001,234,032,040,136
5800 :017,160,044,145,003,169,194
5806 :035,145,001,076,210,022,151
5812 :160,000,177,001,201,034,241
5818 :208,004,169,032,145,001,233
5824 :160,022,169,033,145,001,210
5830 :234,032,040,017,160,044,213
5836 :177,001,201,051,176,013,055
5842 :222,004,001,208,008,254,139
5848 :002,001,169,005,157,004,042
5854 :001,222,006,001,208,018,166
5860 :222,007,001,208,013,169,080
5866 :007,032,009,019,254,000,043
5872 :001,169,096,157,006,001,158
5878 :160,003,165,229,240,002,021
5884 :160,003,132,151,076,048,054
5890 :027,176,015,234,234,234,154
5896 :189,002,001,056,229,226,199
5902 :144,004,201,003,144,003,001
5908 :076,195,023,169,006,032,009
5914 :009,019,169,000,157,000,124
5920 :001,169,032,160,022,145,049
5926 :001,160,044,177,001,201,110
5932 :035,208,004,169,032,145,125
5938 :001,169,037,032,059,023,115
5944 :076,106,027,248,024,101,126
5950 :239,133,239,165,237,105,156
5956 :000,133,237,197,236,144,247
5962 :016,208,006,165,239,197,137
5968 :238,144,008,165,237,133,237
5974 :236,165,239,133,238,165,238
5980 :237,197,235,208,007,024,232
5986 :105,004,032,053,017,234,031
5992 :216,076,063,017,234,201,143
5998 :005,208,078,189,001,001,080
6004 :074,133,241,189,002,001,244
6010 :074,133,242,198,242,032,019
6016 :114,016,169,036,160,022,133
6022 :145,001,165,180,074,074,005
6028 :168,185,184,000,160,022,091
6034 :145,003,032,080,027,176,097
6040 :035,169,005,032,009,019,165
6046 :222,002,001,222,002,001,096
6052 :169,001,157,006,001,157,143
6058 :007,001,169,016,157,003,011
6064 :001,157,004,001,169,003,255
6070 :157,000,001,076,195,023,122
6076 :076,246,022,201,003,240,208
6082 :024,138,024,105,016,170,159
6088 :230,180,165,180,201,012,144
6094 :240,003,076,143,021,096,017
6100 :000,000,000,000,000,000,212
6106 :000,189,005,001,133,145,179
6112 :189,009,001,208,083,189,135
6118 :002,001,197,226,176,004,068
6124 :169,001,208,002,169,000,017
6130 :133,144,189,002,001,056,255
6136 :229,226,016,005,073,255,028
6142 :024,105,013,013,013,013,179
```

Program 4:

Bagdad—VIC Version, Part 3

See instructions in article before beginning.

```
6144 :001,201,004,176,034,189,093
6150 :001,001,197,225,176,004,098
6156 :169,016,208,002,169,000,064
6162 :197,229,208,017,165,180,246
6168 :201,004,144,011,189,009,070
6174 :001,208,006,165,229,073,200
6180 :016,133,145,032,016,019,141
6186 :201,250,144,007,189,005,070
6192 :001,073,016,133,145,076,236
6198 :247,024,201,001,208,008,231
6204 :189,002,001,201,016,076,033
6210 :234,023,201,002,208,073,039
6216 :189,002,001,160,000,221,133
6222 :011,001,016,003,234,160,247
6228 :001,132,144,160,000,189,198
6234 :003,001,048,002,160,016,064
6240 :132,145,169,026,056,253,109
6246 :003,001,133,176,189,001.093
```

```
6252 :001,201,010,208,010,169,195
6258 :255,133,145,254,009,001,143
6264 :076,247,024,048,007,197,207
6270 :176,016,007,076,247,024,160
6276 :197,176,016,111,165,145,174
6282 :073,016,133,145,076,247,060
6288 :024,201,003,208,098,169,079
6294 :255,133,145,169,016,157,001
6300 :003,001,189,002,001,197,037
6306 :226,208,005,169,000,157,159
6312 :009,001,016,004,169,001,112
6318 :208,002,169,000,133,144,062
6324 :208,065,189,001,001,056,188
6330 :229,225,016,005,073,255,221
6336 :024,105,001,201,004,016,031
6342 :048,169,000,157,009,001,070
6348 :076,247,024,000,056,233,072
6354 :016,016,005,073,255,024,087
6360 :105,001,133,240,096,000,023
6366 :000,000,157,005,001,169,042
6372 :000,157,012,001,076,028,246
6378 :026,000,201,022,176,004,151
6384 :198,148,230,149,096,000,037
6390 :000,222,010,001,208,083,002
6396 :189,009,001,201,001,240,125
6402 :002,198,189,032,016,019,202
6408 :009,192,157,010,001,032,153
6414 :016,019,160,001,197,147,042
6420 :144,053,165,189,197,190,190
6426 :016,047,160,000,230,189,156
6432 :165,180,010,010,133,176,194
6438 :132,183,032,016,019,164,072
6444 :183,197,176,176,026,160,194
6450 :002,189,002,001,201,012,201
6456 :176,004,169,004,208,006,111
6462 :201,028,176,004,169,016,144
6468 :208,002,169,036,157,011,139
6474 :001,152,157,009,001,234,116
6480 :189,001,001,133,193,189,018
6486 :002,001,133,194,222,006,132
6492 :001,208,092,189,003,001,074
6498 :032,041,019,201,003,208,090
6504 :003,254,012,001,032,142,036
6510 :026,144,019,188,001,001,233
6516 :132,193,165,195,073,031,137
6522 :024,105,001,133,195,169,237
6528 :032,157,012,001,164,145,127
6534 :208,013,165,195,197,148,036
6540 :144,007,198,195,169,000,085
6546 :157,005,001,192,016,208,213
6552 :013,165,195,197,149,176,023
6558 :007,230,195,169,016,157,164
6564 :005,001,165,195,157,003,178
6570 :001,032,208,024,169,009,101
6576 :056,229,240,234,234,234,123
6582 :234,234,157,006,001,222,012
6588 :007,001,208,077,189,004,162
6594 :001,032,149,019,032,142,057
6600 :026,144,014,189,002,001,064
6606 :133,194,165,196,073,031,230
6612 :024,105,001,133,196,164,067
6618 :144,208,015,169,030,056,072
6624 :229,180,074,197,196,176,252
6630 :002,198,196,076,248,025,207
6636 :169,034,024,101,180,074,050
6642 :197,196,144,002,230,196,183
6648 :165,196,157,004,001,032,035
6654 :208,024,169,009,056,229,181
6660 :240,234,234,234,234,234,134
6666 :157,007,001,189,012,001,121
6672 :201,007,048,008,189,005,218
6678 :001,073,016,076,224,024,180
6684 :189,001,001,133,241,189,014
6690 :002,001,133,242,032,154,086
6696 :016,165,193,157,001,001,061
6702 :133,241,165,194,157,002,170
6708 :001,133,242,189,005,001,111
6714 :133,243,165,180,074,074,159
6720 :168,185,184,000,133,244,210
6726 :032,015,016,076,195,023,171
6732 :000,000,000,000,134,150,104
6738 :160,000,185,000,001,201,117
6744 :003,208,040,196,150,240,157
6750 :036,185,001,001,056,229,090
6756 :193,016,005,073,255,024,154
6762 :105,001,201,003,176,019,099
6768 :185,002,001,056,229,194,011
6774 :016,005,073,255,024,105,084
6780 :001,201,003,176,002,056,051
6786 :096,152,024,105,016,168,179
6792 :192,192,208,200,024,096,024
6798 :165,224,208,190,234,234,117
6804 :165,225,056,229,193,016,008
6810 :005,073,255,024,105,001,105
6816 :201,003,176,172,165,226,079
6822 :056,229,194,016,005,073,227
6828 :255,024,105,001,201,003,249
6834 :176,156,165,226,197,194,012
6840 :208,007,169,003,032,009,100
6846 :019,056,096,016,008,032,161
6852 :240,026,104,104,076,195,173
6858 :023,169,255,133,224,165,147
6864 :225,133,241,165,226,133,051
6870 :242,032,154,016,169,008,067
6876 :032,009,019,198,233,234,177
6882 :234,032,063,017,056,096,212
6888 :000,000,000,000,000,000,232
6894 :000,000,254,000,001,189,170
6900 :001,001,133,241,189,002,043
6906 :001,133,242,024,105,001,244
6912 :157,002,001,032,154,016,106
6918 :169,008,032,009,019,189,176
6924 :009,001,208,002,198,189,107
6930 :169,001,157,004,001,157,251
6936 :007,001,169,000,157,006,108
6942 :001,169,014,133,228,169,232
6948 :001,157,009,001,096,000,044
6954 :000,000,000,000,000,000,042
6960 :189,001,001,041,254,056,078
6966 :229,225,144,005,197,151,237
6972 :076,003,023,201,000,240,091
6978 :004,201,255,208,003,024,249
6984 :144,242,056,176,239,000,161
6990 :000,000,222,006,001,240,035
6996 :002,056,096,254,006,001,243
7002 :189,001,001,133,193,189,028
7008 :002,001,056,233,002,133,011
7014 :194,076,080,026,198,252,160
7020 :076,195,023,000,162,000,052
7026 :032,245,003,138,041,001,062
7032 :024,105,026,141,001,144,049
7038 :138,041,003,024,105,012,193
7044 :141,014,144,169,140,141,113
7050 :013,144,141,010,144,232,054
7056 :224,040,208,222,169,058,041
7062 :133,247,169,059,133,246,113
7068 :169,060,133,248,165,253,160
7074 :032,000,016,162,013,032,161
7080 :245,003,142,014,144,169,117
7086 :156,141,013,144,141,010,011
```

```
7092 :144,202,208,239,169,032,150
7098 :133,246,133,247,133,248,046
7104 :032,245,003,076,226,003,009
7110 :000,000,152,170,165,226,143
7116 :221,002,001,208,017,169,054
7122 :002,032,009,019,165,227,152
7128 :073,031,024,105,001,133,071
7134 :227,076,189,020,016,006,244
7140 :032,240,026,076,189,020,043
7146 :032,203,026,076,189,020,012
7152 :021,009,021,041,003,025,104
7158 :039,025,009,030,105,031,229
7164 :176,030,193,030,007,007,183
7170 :003,019,243,159,127,003,044
7176 :128,192,192,128,128,128,136
7182 :128,128,031,095,153,102,139
7188 :000,000,000,000,128,160,052
7194 :144,096,000,000,000,000,010
7200 :000,000,000,001,015,009,057
7206 :007,000,120,124,060,056,149
7212 :056,248,248,056,001,005,146
7218 :009,006,000,000,000,000,065
7224 :248,250,153,102,000,000,041
7230 :000,000,000,000,000,000,062
7236 :007,007,003,019,000,000,104
7242 :000,000,128,192,192,128,202
7248 :243,159,127,003,031,095,226
7254 :153,102,128,128,128,128,085
7260 :128,160,144,096,000,000,108
7266 :000,000,000,000,000,001,099
7272 :000,000,000,000,120,124,092
7278 :060,056,015,009,007,000,001
7284 :001,005,009,006,056,248,185
7290 :248,056,248,250,153,102,155
7296 :030,062,060,028,028,031,111
7302 :031,028,000,000,000,128,065
7308 :240,144,224,000,031,095,106
7314 :153,102,000,000,000,000,145
7320 :128,160,144,096,000,000,168
7326 :000,000,001,003,003,001,166
7332 :001,001,001,001,224,224,104
7338 :192,200,207,249,254,192,184
7344 :001,005,009,006,000,000,197
7350 :000,000,248,250,153,102,167
7356 :000,000,000,000,000,000,188
7362 :000,000,030,062,060,028,118
7368 :000,000,000,000,000,000,200
7374 :000,128,028,031,031,028,196
7380 :031,095,153,102,240,144,209
7386 :224,000,128,160,144,096,202
7392 :000,000,000,000,001,003,228
7398 :003,001,000,000,000,000,234
7404 :224,224,192,200,001,001,054
7410 :001,001,001,005,009,006,009
7416 :207,249,254,192,248,250,112
7422 :153,102,000,000,000,000,253
7428 :000,000,000,000,060,024,088
7434 :024,060,126,255,255,126,088
7440 :000,000,000,000,060,024,100
7446 :024,060,126,255,255,126,100
7452 :000,000,000,000,001,027,056
7458 :027,061,126,255,255,126,116
7464 :199,195,227,231,199,231,042
7470 :069,131,255,089,087,027,192
7476 :093,083,255,255,255,153,122
7482 :119,183,215,057,255,255,118
7488 :195,189,185,165,157,189,120
7494 :195,255,247,231,215,247,180
7500 :247,247,193,255,195,189,122
7506 :253,243,207,191,129,255,080
7512 :195,189,253,227,253,189,114
7518 :195,255,251,243,235,219,212
7524 :129,251,251,255,129,191,026
7530 :135,251,253,187,199,255,106
7536 :227,223,191,131,189,189,238
7542 :195,255,129,189,251,247,104
7548 :239,239,239,255,195,189,200
7554 :189,195,189,189,195,255,062
7560 :195,189,189,193,253,251,126
7566 :199,255,132,120,072,072,224
7572 :072,072,072,120,016,040,028
7578 :040,040,040,040,068,068,194
7584 :130,124,064,064,064,064,158
7590 :064,080,128,120,068,066,180
7596 :066,066,066,066,068,068,060
7602 :068,068,068,068,124,130,192
7608 :124,068,068,068,068,068,136
7614 :068,130,078,068,068,068,158
7620 :068,068,124,130,066,066,206
7626 :066,066,066,068,120,128,204
7632 :016,016,056,124,254,254,160
7638 :254,124,056,056,056,056,048
7644 :056,056,056,255,255,231,105
7650 :195,195,129,129,129,129,108
7656 :129,129,129,129,129,129,238
7662 :129,255,255,255,255,255,106
7668 :255,255,255,255,255,255,238
7674 :255,255,255,255,255,255,244
7680 :032,050,051,052,053,051,033
7686 :053,032,054,055,056,057,057
7692 :055,057,032,032,032,032,252
7698 :032,032,032,032,032,032,210
7704 :032,032,032,032,032,000,184
7710 :160,000,132,233,169,032,244
7716 :153,000,030,153,000,031,147
7722 :169,007,153,000,150,153,162
7728 :000,151,136,208,237,169,181
7734 :061,133,247,169,062,133,091
7740 :246,169,063,133,248,032,183
7746 :219,016,032,063,017,160,061
7752 :007,185,000,002,153,183,090
7758 :030,185,007,002,153,205,148
7764 :030,185,014,002,153,245,201
7770 :030,185,021,002,153,252,221
7776 :030,136,208,229,169,003,103
7782 :160,088,153,176,150,136,197
7788 :208,250,076,162,003,032,071
7794 :178,016,041,002,240,249,072
7800 :169,003,133,233,169,004,063
7806 :133,235,169,001,133,190,219
7812 :169,128,133,147,169,001,111
7818 :133,251,169,012,133,148,216
7824 :169,021,133,149,160,088,096
7830 :169,032,153,176,030,136,078
7836 :208,250,169,000,133,237,129
7842 :133,239,169,144,133,224,180
7848 :032,063,017,169,001,133,071
7854 :254,234,162,255,154,165,118
7860 :251,133,252,010,010,010,078
7866 :010,133,176,162,000,169,068
7872 :001,157,000,001,232,228,043
7878 :176,208,248,169,000,157,132
7884 :000,001,232,224,193,208,038
7890 :248,169,000,133,178,133,047
7896 :189,169,128,133,179,032,022
7902 :245,003,032,139,021,165,059
7908 :233,016,003,076,030,002,076
7914 :165,252,208,239,248,165,231
7920 :254,024,105,001,133,254,243
7926 :216,041,015,240,004,201,195
```

```
7932 :005,208,010,165,254,201,071
7938 :022,176,004,198,148,230,012
7944 :149,162,000,169,010,133,119
7950 :205,160,000,185,212,003,011
7956 :153,184,030,169,001,153,198
7962 :184,150,200,192,004,208,196
7968 :240,141,189,150,141,190,059
7974 :150,165,254,201,015,144,199
7980 :014,041,015,024,105,176,163
7986 :141,190,030,165,254,074,136
7992 :074,074,074,024,105,176,071
7998 :141,189,030,169,064,044,187
8004 :029,145,240,251,173,020,158
8010 :145,169,096,141,021,145,023
8016 :134,150,032,243,019,166,056
8022 :150,189,192,003,141,012,005
8028 :144,169,015,141,014,144,207
8034 :141,010,144,141,011,144,177
8040 :141,013,144,198,205,208,245
8046 :160,232,224,017,208,151,078
8052 :169,000,141,012,144,160,230
8058 :008,169,032,153,183,030,185
8064 :136,208,250,169,000,133,000
8070 :208,133,209,165,251,201,021
8076 :012,016,003,024,105,001,045
8082 :133,251,201,003,048,003,017
8088 :056,233,002,133,190,076,074
8094 :176,002,000,000,169,080,073
8100 :133,205,032,158,017,198,139
8106 :205,208,249,076,113,002,255
8112 :000,000,000,000,000,000,176
8118 :000,000,000,000,000,000,182
8124 :000,000,000,000,227,228,131
8130 :231,232,232,231,231,228,043
8136 :228,227,228,231,232,237,047
8142 :231,232,228,000,000,000,129
8148 :151,129,150,133,032,000,039
8154 :000,000,000,000,076,236,018
8160 :024,000,169,000,141,010,056
8166 :144,141,013,144,169,015,088
8172 :141,014,144,165,253,076,005
8178 :000,016,000,134,150,032,062
8184 :243,019,032,158,017,166,115
8190 :150,096,013,013,013,013,040
```

Program 5: Bagdad—64 Version

Translation by Kevin Martin, Editorial Programmer

See instructions in article before beginning.

```
2049 :011,008,000,000,158,050,228
2055 :048,054,049,000,000,000,158
2061 :076,066,008,000,002,002,167
2067 :045,002,002,000,000,000,068
2073 :000,000,000,000,000,004,029
2079 :252,000,013,000,000,000,040
2085 :000,000,000,000,000,000,037
2091 :000,000,000,000,003,000,046
2097 :249,002,008,002,002,002,058
2103 :002,002,002,002,002,002,067
2109 :002,002,000,000,000,169,234
2115 :000,141,063,008,141,064,228
2121 :008,141,065,008,169,008,216
2127 :032,210,255,169,142,032,151
2133 :210,255,120,165,001,041,109
2139 :251,133,001,169,048,133,058
2145 :252,169,000,133,251,133,011
2151 :253,169,208,133,254,160,000
2157 :000,177,253,145,251,200,111
2163 :208,249,230,252,230,254,002
2169 :165,252,201,056,208,239,218
2175 :165,001,009,004,133,001,184
2181 :088,173,024,208,041,240,139
2187 :009,012,141,024,208,169,190
2193 :022,133,252,169,049,133,135
2199 :251,160,000,132,253,169,092
2205 :048,133,254,177,251,145,141
2211 :253,200,208,249,230,252,019
2217 :230,254,177,251,145,253,199
2223 :200,192,080,208,247,032,110
2229 :192,018,169,147,032,210,181
2235 :255,169,000,141,033,208,225
2241 :141,032,208,169,012,141,128
2247 :134,002,169,000,141,046,179
2253 :021,169,080,141,045,021,170
2259 :169,001,141,040,208,141,143
2265 :041,208,141,042,208,141,230
2271 :043,208,169,005,141,039,060
2277 :208,169,006,141,044,208,237
2283 :141,045,208,169,004,141,175
2289 :046,208,160,000,169,071,127
2295 :133,251,169,020,133,252,181
2301 :177,251,240,010,032,210,149
2307 :255,200,208,246,230,252,114
2313 :208,242,032,057,017,162,215
2319 :000,138,157,000,208,232,238
2325 :224,017,208,248,169,160,023
2331 :141,231,007,169,012,141,216
2337 :231,219,169,009,141,134,168
2343 :002,169,004,141,000,021,120
2349 :074,141,211,020,141,229,093
2355 :020,169,000,141,031,008,164
2361 :141,047,008,141,035,021,194
2367 :169,002,141,036,021,032,208
2373 :073,018,162,000,076,078,220
2379 :009,162,001,169,013,157,074
2385 :248,007,169,000,157,022,172
2391 :008,157,212,020,157,024,153
2397 :021,232,224,008,208,235,253
2403 :169,000,162,017,157,003,095
2409 :021,157,255,207,202,224,147
2415 :002,208,245,169,255,141,107
2421 :021,208,169,255,141,015,158
2427 :212,169,128,141,018,212,235
2433 :162,000,189,049,021,157,195
2439 :064,003,232,224,192,208,034
2445 :245,162,000,189,241,021,231
2451 :157,192,002,232,224,064,250
2457 :208,245,162,002,138,157,041
2463 :047,008,232,224,016,208,126
2469 :248,173,035,021,240,008,122
2475 :032,063,015,162,001,076,008
2481 :185,009,162,000,032,144,197
2487 :011,232,189,212,020,201,024
2493 :002,240,007,201,001,240,112
2499 :008,076,207,009,169,002,154
2505 :076,189,010,076,198,010,248
2511 :165,162,041,031,240,009,087
2517 :189,248,020,141,238,020,045
2523 :076,109,010,173,212,020,051
2529 :201,003,208,003,076,058,006
2535 :010,173,027,212,201,065,151
2541 :144,011,201,129,144,031,129
2547 :201,193,144,067,076,098,254
2553 :010,138,010,168,185,031,023
2559 :008,048,008,169,008,141,125
2565 :238,020,076,015,010,169,021
2571 :004,141,238,020,076,103,081
2577 :010,138,010,168,056,185,072
2583 :004,021,237,004,021,141,195
```

```
2589 :019,008,185,022,008,237,252
2595 :022,008,013,019,008,144,249
2601 :008,169,004,141,238,020,109
2607 :076,055,010,169,008,141,250
2613 :238,020,076,103,010,138,126
2619 :010,168,056,185,004,021,247
2625 :237,004,021,141,019,008,239
2631 :185,022,008,237,022,008,041
2637 :013,019,008,176,008,169,214
2643 :004,141,238,020,076,095,145
2649 :010,169,008,141,238,020,163
2655 :076,103,010,169,000,141,082
2661 :238,020,173,238,020,157,179
2667 :248,020,165,161,205,239,121
2673 :020,240,009,141,239,020,014
2679 :173,027,212,157,240,020,180
2685 :173,212,020,201,003,240,206
2691 :027,189,240,020,048,033,176
2697 :138,010,168,185,005,021,152
2703 :205,005,021,144,011,169,186
2709 :002,013,238,020,141,238,033
2715 :020,076,184,010,169,001,103
2721 :013,238,020,141,238,020,063
2727 :076,184,010,138,010,168,241
2733 :185,005,021,205,005,021,103
2739 :144,223,076,159,010,173,196
2745 :238,020,041,015,142,228,101
2751 :020,032,181,011,174,228,069
2757 :020,232,236,211,020,240,132
2763 :003,076,185,009,032,007,003
2769 :015,032,104,015,032,122,017
2775 :015,032,212,014,173,229,122
2781 :020,201,001,240,050,173,138
2787 :036,021,048,039,173,212,244
2793 :020,201,003,208,011,169,077
2799 :000,141,022,008,141,004,043
2805 :021,141,005,021,173,141,235
2811 :002,041,001,208,249,032,016
2817 :225,255,240,003,076,166,198
2823 :009,169,000,141,021,208,043
2829 :096,032,228,014,076,183,130
2835 :008,238,000,021,173,000,203
2841 :021,201,017,144,002,169,067
2847 :016,074,141,211,020,162,143
2853 :011,160,017,024,032,240,009
2859 :255,162,000,189,125,011,017
2865 :240,006,032,210,255,232,000
2871 :208,245,169,000,174,000,083
2877 :021,202,202,202,032,205,157
2883 :189,169,050,141,248,020,116
2889 :032,089,018,162,000,032,150
2895 :144,011,032,007,015,032,064
2901 :104,015,032,212,014,206,156
2907 :248,020,208,237,162,011,209
2913 :160,017,024,032,240,255,057
2919 :162,000,189,133,011,240,070
2925 :006,032,210,255,232,208,028
2931 :245,173,211,020,141,229,110
2937 :020,076,076,009,152,018,216
2943 :087,065,086,069,032,000,210
2949 :149,146,069,070,069,070,194
2955 :069,070,069,070,000,189,094
2961 :000,220,041,012,141,210,001
2967 :014,189,000,220,041,016,119
2973 :208,008,173,210,014,009,011
2979 :002,076,172,011,173,210,039
2985 :014,009,001,141,210,014,046
2991 :169,015,056,237,210,014,108
2997 :032,127,017,010,168,138,161
3003 :010,170,189,005,021,240,054
3009 :008,185,179,014,072,185,068
3015 :178,014,072,096,076,211,078
3021 :012,189,005,021,056,237,213
3027 :017,008,201,050,176,011,162
3033 :169,000,056,253,047,008,238
3039 :157,047,008,169,050,157,043
3045 :005,021,169,002,141,018,073
3051 :008,076,087,013,189,005,101
3057 :021,024,109,017,008,201,109
3063 :229,144,011,169,000,056,088
3069 :253,047,008,157,047,008,005
3075 :169,230,157,005,021,169,242
3081 :001,141,018,008,076,087,084
3087 :013,169,004,141,018,008,112
3093 :138,074,168,189,004,021,103
3099 :056,237,017,008,141,020,250
3105 :008,185,022,008,233,000,233
3111 :141,021,008,056,173,020,202
3117 :008,233,024,141,019,008,222
3123 :173,021,008,233,000,013,243
3129 :019,008,176,010,169,001,184
3135 :141,021,008,169,063,141,094
3141 :020,008,173,020,008,157,199
3147 :004,021,173,021,008,153,199
3153 :022,008,076,087,013,169,200
3159 :003,141,018,008,138,074,213
3165 :168,189,004,021,024,109,096
3171 :017,008,141,020,008,185,222
3177 :022,008,105,000,141,021,146
3183 :008,056,173,020,008,233,097
3189 :064,141,019,008,173,021,031
3195 :008,233,001,013,019,008,149
3201 :144,010,169,000,141,021,102
3207 :008,169,024,141,020,008,249
3213 :173,020,008,157,004,021,012
3219 :173,021,008,153,022,008,020
3225 :076,087,013,032,217,012,078
3231 :138,074,168,185,212,020,188
3237 :208,003,076,016,013,096,065
3243 :032,246,012,076,159,012,196
3249 :032,217,012,138,074,168,050
3255 :185,212,020,208,238,076,098
3261 :050,013,032,246,012,076,106
3267 :180,012,032,217,012,189,069
3273 :031,008,240,005,016,088,077
3279 :076,073,013,096,032,246,231
3285 :012,076,200,012,189,047,237
3291 :008,201,248,240,008,222,122
3297 :047,008,189,047,008,016,028
3303 :029,056,169,000,253,047,017
3309 :008,074,074,141,017,008,047
3315 :076,206,011,189,047,008,012
3321 :201,008,240,008,254,047,239
3327 :008,189,047,008,048,227,014
3333 :189,047,008,074,074,141,026
3339 :017,008,076,239,011,138,244
3345 :074,168,169,013,153,248,074
3351 :007,189,031,008,201,016,219
3357 :240,008,254,031,008,189,247
3363 :031,008,048,034,189,031,120
3369 :008,074,074,141,017,008,107
3375 :076,016,012,138,074,168,019
3381 :169,014,153,248,007,189,065
3387 :031,008,201,240,240,008,019
3393 :222,031,008,189,031,008,042
3399 :016,222,169,000,056,253,019
3405 :031,008,074,074,141,017,166
3411 :008,076,086,012,142,030,181
3417 :008,138,074,168,185,212,106
3423 :020,201,003,208,001,096,112
```

```
3429 :189,004,021,056,233,024,116
3435 :141,020,008,185,022,008,235
3441 :233,000,141,021,008,078,082
3447 :021,008,110,020,008,078,108
3453 :020,008,078,020,008,189,192
3459 :005,021,056,233,047,074,055
3465 :074,074,141,019,008,173,114
3471 :019,008,010,168,185,021,042
3477 :020,024,109,020,008,133,207
3483 :251,185,022,020,105,000,226
3489 :133,252,162,000,189,009,138
3495 :020,168,177,251,201,032,248
3501 :208,014,232,224,012,208,047
3507 :241,032,099,016,176,007,238
3513 :174,030,008,096,076,136,193
3519 :014,172,021,008,240,011,145
3525 :172,020,008,208,087,172,096
3531 :021,008,076,211,013,172,192
3537 :020,008,185,212,020,201,087
3543 :001,208,003,076,101,014,106
3549 :201,002,208,023,169,001,057
3555 :153,212,020,185,220,020,013
3561 :045,021,208,141,021,208,109
3567 :206,229,020,032,181,015,154
3573 :076,101,014,152,010,170,000
3579 :189,005,021,205,005,021,185
3585 :176,003,076,021,015,169,205
3591 :002,153,212,020,169,015,066
3597 :153,248,007,185,037,021,152
3603 :153,024,021,152,010,168,035
3609 :169,000,153,031,008,153,027
3615 :047,008,173,020,008,010,041
3621 :168,174,030,008,173,033,111
3627 :021,048,021,169,000,056,102
3633 :249,031,008,153,031,008,017
3639 :169,000,056,253,031,008,060
3645 :157,031,008,076,101,014,192
3651 :140,034,021,173,030,008,217
3657 :074,168,185,212,020,208,172
3663 :021,172,034,021,169,000,240
3669 :056,253,047,008,157,047,141
3675 :008,169,000,056,249,047,108
3681 :008,153,047,008,174,030,005
3687 :008,173,018,008,201,001,000
3693 :240,012,201,002,240,011,047
3699 :201,003,240,010,201,004,006
3705 :240,009,076,206,011,076,227
3711 :239,011,076,021,012,076,050
3717 :091,012,096,201,000,240,005
3723 :024,201,005,144,020,173,194
3729 :030,008,170,074,168,185,012
3735 :212,020,208,009,169,000,001
3741 :056,253,047,008,157,047,213
3747 :008,076,101,014,169,000,019
3753 :133,162,165,162,201,002,226
3759 :208,250,096,202,011,196,114
3765 :012,210,012,202,011,015,131
3771 :013,155,012,170,012,202,239
3777 :011,049,013,176,012,190,132
3783 :012,202,011,202,011,202,071
3789 :011,202,011,202,011,013,143
3795 :000,169,019,056,237,229,153
3801 :020,170,160,000,136,208,143
3807 :253,202,208,250,096,162,114
3813 :002,189,001,021,221,063,214
3819 :008,240,005,176,009,076,237
3825 :006,015,202,048,016,076,092
3831 :230,014,162,000,189,001,075
3837 :021,157,063,008,232,224,190
3843 :003,208,245,096,162,000,205
3849 :189,004,021,157,000,208,076
3855 :232,224,016,208,245,096,012
3861 :169,003,141,212,020,169,223
3867 :000,141,004,021,141,005,083
3873 :021,141,022,008,169,050,188
3879 :141,035,021,206,036,021,243
3885 :048,009,174,036,021,232,053
3891 :169,160,157,224,007,032,032
3897 :221,018,174,030,008,096,092
3903 :173,000,220,041,016,240,241
3909 :014,238,039,208,206,035,041
3915 :021,240,006,162,000,032,024
3921 :127,017,096,169,005,141,124
3927 :039,208,169,000,141,035,167
3933 :021,141,212,020,141,031,147
3939 :008,141,047,008,096,162,049
3945 :008,169,000,029,022,008,085
3951 :202,048,004,010,076,108,047
3957 :015,141,016,208,096,162,243
3963 :000,189,024,021,201,000,046
3969 :240,043,222,024,021,208,119
3975 :038,189,248,007,201,011,061
3981 :208,021,169,013,157,248,189
3987 :007,169,000,157,212,020,200
3993 :138,010,168,169,015,153,038
3999 :031,008,076,174,015,169,120
4005 :011,157,248,007,169,100,089
4011 :157,024,021,232,236,211,028
4017 :020,208,200,096,169,000,102
4023 :153,024,021,120,248,024,005
4029 :173,001,021,105,080,141,198
4035 :001,021,173,002,021,105,006
4041 :002,141,002,021,173,003,031
4047 :021,105,000,141,003,021,242
4053 :216,056,173,002,021,237,150
4059 :045,021,141,047,021,173,155
4065 :003,021,237,046,021,013,054
4071 :047,021,144,037,173,036,177
4077 :021,201,007,176,030,238,142
4083 :036,021,169,000,174,036,167
4089 :021,157,224,007,248,173,055
4095 :045,021,024,105,080,141,159
4101 :045,021,173,046,021,105,160
4107 :000,141,046,021,216,088,011
4113 :162,000,032,026,016,174,171
4119 :030,008,096,173,003,021,098
4125 :074,074,074,074,024,105,198
4131 :176,157,199,007,173,003,238
4137 :021,041,015,024,105,176,167
4143 :157,200,007,173,002,021,095
4149 :074,074,074,074,024,105,222
4155 :176,157,201,007,173,002,007
4161 :021,041,015,024,105,176,191
4167 :157,202,007,173,001,021,120
4173 :074,074,074,074,024,105,246
4179 :176,157,203,007,173,001,032
4185 :021,041,015,024,105,176,215
4191 :157,204,007,096,160,000,207
4197 :173,030,008,074,141,021,036
4203 :008,140,020,008,204,021,252
4209 :008,208,003,076,021,017,190
4215 :152,010,170,185,212,020,100
4221 :201,001,208,003,076,021,123
4227 :017,189,004,021,141,208,199
4233 :020,189,005,021,141,210,211
4239 :020,185,022,008,141,209,216
4245 :020,173,030,008,170,074,112
4251 :168,056,173,208,020,253,009
```

```
4257 :004,021,141,019,008,173,015
4263 :209,020,249,022,008,013,176
4269 :019,008,176,022,056,189,131
4275 :004,021,237,208,020,141,042
4281 :208,020,185,022,008,237,097
4287 :209,020,141,209,020,076,098
4293 :218,016,056,173,208,020,120
4299 :253,004,021,141,208,020,082
4305 :173,209,020,249,022,008,122
4311 :141,209,020,056,173,208,254
4317 :020,233,025,141,019,008,155
4323 :173,209,020,233,000,013,107
4329 :019,008,176,040,189,005,158
4335 :021,205,210,020,176,013,116
4341 :056,173,210,020,253,005,194
4347 :021,141,210,020,076,012,219
4353 :017,056,189,005,021,237,014
4359 :210,020,141,210,020,173,013
4365 :210,020,201,017,144,016,109
4371 :240,014,172,020,008,200,161
4377 :204,211,020,240,003,076,011
4383 :108,016,024,096,173,208,144
4389 :020,205,210,020,176,007,163
4395 :169,128,141,033,021,056,079
4401 :096,169,000,141,033,021,253
4407 :056,096,160,000,169,238,006
4413 :133,251,169,018,133,252,249
4419 :177,251,240,010,032,210,219
4425 :255,200,208,246,230,252,184
4431 :208,242,173,063,008,141,146
4437 :001,021,173,064,008,141,237
4443 :002,021,173,065,008,141,245
4449 :003,021,162,019,032,026,104
4455 :016,169,000,141,004,021,198
4461 :141,005,021,141,001,021,183
4467 :141,002,021,141,003,021,188
4473 :162,000,032,026,016,096,197
4479 :072,138,010,168,185,005,193
4485 :021,240,003,076,071,018,050
4491 :224,000,240,111,165,162,017
4497 :041,064,205,032,021,208,204
4503 :003,076,047,018,141,032,212
4509 :021,173,027,212,041,007,126
4515 :201,004,144,030,201,004,235
4521 :240,039,201,005,240,048,174
4527 :201,006,240,062,169,040,125
4533 :153,004,021,169,166,153,079
4539 :005,021,169,001,157,022,050
4545 :008,076,008,018,169,175,135
4551 :153,004,021,169,118,153,049
4557 :005,021,076,008,018,169,246
4563 :045,153,004,021,169,078,169
4569 :153,005,021,076,008,018,242
4575 :169,040,153,004,021,169,011
4581 :078,153,005,021,169,001,144
4587 :157,022,008,076,008,018,012
4593 :169,045,153,004,021,169,034
4599 :166,153,005,021,076,008,164
4605 :018,169,175,153,004,021,025
4611 :169,222,153,005,021,140,201
4617 :030,008,152,072,138,072,225
4623 :032,099,016,008,104,141,159
4629 :020,008,104,170,104,168,083
4635 :173,020,008,072,040,144,228
4641 :013,169,000,153,004,021,137
4647 :157,022,008,153,005,021,149
4653 :104,104,224,000,240,020,225
4659 :173,027,212,048,005,169,173
4665 :015,076,063,018,169,241,127
4671 :153,031,008,169,004,153,069
4677 :047,008,104,096,173,000,241
4683 :220,041,001,208,249,169,195
4689 :147,032,210,255,032,057,046
4695 :017,096,160,000,185,125,158
4701 :018,240,022,141,000,212,214
4707 :200,185,125,018,141,001,001
4713 :212,200,185,125,018,170,247
4719 :032,165,018,200,076,091,181
4725 :018,141,000,212,141,001,118
4731 :212,096,180,004,007,071,181
4737 :005,007,152,005,011,071,124
4743 :005,011,180,004,011,001,091
4749 :000,003,180,004,007,071,150
4755 :005,007,152,005,007,012,079
4761 :007,007,071,005,007,152,146
4767 :005,007,180,004,012,000,111
4773 :152,072,142,048,021,162,250
4779 :000,032,144,011,032,007,141
4785 :015,032,104,015,032,212,075
4791 :014,206,048,021,208,237,149
4797 :104,168,096,169,024,141,123
4803 :024,212,169,017,141,005,251
4809 :212,169,240,141,006,212,157
4815 :169,000,141,000,212,141,102
4821 :001,212,169,033,141,004,005
4827 :212,096,162,255,142,001,063
4833 :212,160,000,200,208,253,234
4839 :202,208,245,142,001,212,217
4845 :096,019,013,013,013,013,148
4851 :013,013,149,070,069,070,115
4857 :069,070,069,070,065,066,146
4863 :029,029,029,029,029,029,173
4869 :029,029,029,029,029,029,179
4875 :029,029,029,029,029,029,185
4881 :029,029,029,029,065,066,008
4887 :069,070,069,070,069,070,184
4893 :069,072,071,072,071,072,200
4899 :071,072,067,068,029,029,115
4905 :029,029,029,029,029,029,215
4911 :029,029,029,029,029,029,221
4917 :029,029,029,029,029,029,227
4923 :029,029,067,068,071,072,139
4929 :071,072,071,072,071,017,183
4935 :017,017,029,029,029,029,221
4941 :029,029,029,029,029,029,251
4947 :029,029,029,065,066,069,114
4953 :070,069,070,069,070,069,250
4959 :070,069,070,065,066,013,192
4965 :029,029,029,029,029,029,019
4971 :029,029,029,029,029,029,025
4977 :029,067,068,071,072,071,235
4983 :072,071,072,071,072,071,036
4989 :072,067,068,013,013,013,115
4995 :013,013,070,069,070,069,179
5001 :070,069,070,065,066,029,250
5007 :029,029,029,029,029,029,061
5013 :029,029,029,029,029,029,067
5019 :029,029,029,029,029,029,073
5025 :029,029,029,065,066,069,192
5031 :070,069,070,069,070,069,072
5037 :072,071,072,071,072,071,090
5043 :072,067,068,029,029,029,217
5049 :029,029,029,029,029,029,103
5055 :029,029,029,029,029,029,109
5061 :029,029,029,029,029,029,115
5067 :029,067,068,071,072,071,069
5073 :072,071,072,071,013,013,009
5079 :013,013,013,152,018,083,251
```

```
5085 :067,079,082,069,058,032,096
5091 :048,048,048,048,048,048,003
5097 :032,072,073,071,072,032,073
5103 :083,067,079,082,069,058,165
5109 :032,048,048,048,048,048,005
5115 :048,032,146,064,064,018,111
5121 :032,032,032,032,146,149,168
5127 :019,000,000,001,002,003,032
5133 :040,041,042,043,080,081,084
5139 :082,083,000,004,040,004,232
5145 :080,004,120,004,160,004,141
5151 :200,004,240,004,024,005,252
5157 :064,005,104,005,144,005,108
5163 :184,005,224,005,008,006,219
5169 :048,006,088,006,128,006,075
5175 :168,006,208,006,248,006,185
5181 :032,007,072,007,112,007,042
5187 :152,007,192,007,019,005,193
5193 :017,017,017,017,017,017,175
5199 :029,029,029,029,029,029,253
5205 :029,029,029,073,074,032,095
5211 :032,075,076,032,032,077,159
5217 :078,032,032,079,080,032,174
5223 :032,075,076,032,032,079,173
5229 :080,013,029,029,029,029,062
5235 :029,029,029,029,029,081,085
5241 :082,032,032,083,084,032,210
5247 :032,085,086,032,032,087,225
5253 :088,032,032,083,084,032,228
5259 :032,087,088,013,029,029,161
5265 :029,029,029,029,029,029,063
5271 :029,089,090,032,032,091,002
5277 :092,032,032,093,094,032,020
5283 :032,095,033,032,032,091,222
5289 :092,032,032,095,033,013,210
5295 :029,029,029,029,029,029,093
5301 :029,029,029,034,035,032,113
5307 :032,036,037,032,032,038,138
5313 :039,032,032,040,041,032,153
5319 :032,036,037,032,032,040,152
5325 :041,013,000,070,000,050,123
5331 :003,000,000,002,000,000,216
5337 :000,000,000,254,253,251,207
5343 :247,239,223,191,127,002,228
5349 :003,010,020,030,040,050,126
5355 :060,070,080,009,217,000,159
5361 :043,161,000,000,000,000,189
5367 :000,000,008,008,000,000,007
5373 :000,000,000,007,000,016,020
5379 :000,150,217,130,050,060,098
5385 :222,000,000,000,000,000,231
5391 :000,000,000,000,000,000,015
5397 :000,000,000,000,000,056,077
5403 :000,000,000,000,000,064,091
5409 :000,000,000,000,120,120,017
5415 :120,120,120,090,090,070,137
5421 :080,000,192,000,000,000,061
5427 :000,000,000,000,000,000,051
5433 :000,000,001,240,000,003,045
5439 :248,000,003,248,000,007,057
5445 :248,000,015,240,006,007,073
5451 :192,254,007,192,195,255,146
5457 :192,063,255,192,000,007,022
5463 :192,000,007,192,000,007,229
5469 :192,057,255,220,065,255,113
5475 :194,129,255,193,071,024,197
5481 :226,056,231,028,000,000,134
5487 :000,184,000,000,000,000,039
5493 :000,000,000,000,000,015,132
5499 :128,000,031,192,000,031,249
5505 :192,000,031,224,000,015,079
5511 :240,000,003,224,096,003,189
5517 :224,127,003,255,195,003,180
5523 :255,252,003,224,000,003,116
5529 :224,000,003,224,000,059,151
5535 :255,156,067,255,130,131,129
5541 :255,129,071,024,226,056,158
5547 :231,028,000,000,000,184,102
5553 :000,000,000,000,000,000,177
5559 :000,000,000,000,127,000,054
5565 :000,062,000,000,028,000,023
5571 :000,028,000,000,028,000,251
5577 :000,028,000,000,062,000,035
5583 :000,062,000,000,127,000,140
5589 :000,127,000,000,255,128,211
5595 :001,255,192,003,255,224,125
5601 :007,255,240,007,255,240,205
5607 :007,255,240,003,255,224,191
5613 :000,255,128,000,000,000,108
5619 :000,000,000,000,000,000,243
5625 :000,000,003,000,000,003,255
5631 :128,000,003,000,000,028,158
5637 :000,000,028,000,000,028,061
5643 :000,000,062,000,000,062,135
5649 :000,000,127,000,000,127,015
5655 :000,000,255,128,001,255,150
5661 :192,003,255,224,007,255,197
5667 :240,007,255,240,007,255,015
5673 :240,003,255,224,000,255,250
5679 :128,000,199,195,227,231,003
5685 :199,231,069,131,001,007,179
5691 :031,127,255,255,255,031,245
5697 :128,224,248,254,255,255,149
5703 :255,248,007,007,007,007,090
5709 :007,007,031,031,224,224,089
5715 :224,224,224,224,248,248,195
5721 :255,255,252,240,224,224,003
5727 :192,192,255,255,063,015,043
5733 :007,007,003,003,128,128,121
5739 :128,128,128,128,128,255,234
5745 :001,001,001,001,001,001,119
5751 :001,255,128,064,063,032,150
5757 :032,032,032,032,004,008,009
5763 :240,016,016,016,016,016,195
5769 :003,004,008,008,008,008,176
5775 :008,016,000,128,064,064,167
5781 :064,064,064,032,128,064,053
5787 :063,032,032,032,032,032,122
5793 :004,008,240,000,000,000,157
5799 :000,000,128,064,063,032,198
5805 :032,032,032,032,000,000,045
5811 :224,016,008,004,004,004,183
5817 :032,032,032,032,032,032,121
5823 :032,063,016,016,016,016,094
5829 :016,016,032,192,016,016,229
5835 :016,016,016,032,032,063,122
5841 :032,032,032,032,032,016,129
5847 :016,240,032,032,032,032,087
5853 :032,032,032,032,000,000,093
5859 :000,000,000,000,000,000,227
5865 :032,032,032,032,032,032,169
5871 :032,032,004,004,004,004,063
5877 :004,004,004,004,032,032,069
5883 :032,032,032,032,032,032,187
5889 :032,016,016,016,016,016,113
5895 :016,016,032,032,032,032,167
5901 :032,032,032,032,016,016,173
5907 :016,016,016,016,016,016,115
```

```
5913 :032,032,032,032,032,032,217
5919 :032,032,112,016,016,016,255
5925 :016,016,016,016,032,032,165
5931 :032,032,032,032,032,032,235
5937 :000,000,000,000,000,000,049
5943 :000,000,004,004,004,004,071
5949 :004,004,004,004,032,032,141
5955 :032,032,032,063,064,128,162
5961 :016,016,016,016,016,240,137
5967 :008,004,032,032,032,032,219
5973 :032,032,064,128,016,016,117
5979 :016,016,016,016,008,004,167
5985 :032,032,032,032,032,063,064
5991 :064,128,016,016,016,016,103
5997 :016,240,008,004,032,032,185
6003 :032,032,032,063,064,128,210
6009 :004,004,004,008,016,224,125
6015 :000,000,013,013,013,013,179
```

Budgeteer

(Article on page 76.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: Budgeteer—VIC Loader

```
10 T$="{CLR}{2 SPACES}{GRN}{RVS} {OFF}*
   {RVS} {OFF} BUDGETEER {RVS} {OFF}*
   {RVS} {OFF}{BLU}"                  :rem 37
12 PRINTCHR$(14)T$:PRINT              :rem 230
14 PRINT" USE THE PROGRAM TO{3 SPACES}REC
   ORD YOUR CHECKBOOK BALANCE AND ITS
                                      :rem 93
16 PRINT"ALLOCATION INTO ONE TOTEN ACCOUN
   TS SHOWING{2 SPACES}INTENDED USE.
                                      :rem 135
18 PRINT:PRINT" INCREASE BALANCE WITHDEPO
   SITS.                              :rem 100
20 PRINT:PRINT" WRITE CHECKS AGAINST ANY
   {SPACE}ACCOUNT.                    :rem 190
22 PRINT:PRINT" TRANSFER FUNDS FROM
   {2 SPACES}ONE ACCOUNT TO ANY{4 SPACES}
   OTHER.                             :rem 157
23 PRINT"{HOME}{19 DOWN}"             :rem 140
24 PRINT"INSTRUCTIONS?{2 SPACES}Y/N
                                      :rem 95
26 GETA$:IFA$=""THEN26                :rem 243
28 IFA$="N"THEN118                    :rem 246
30 IFA$<>"Y"THEN23                    :rem 2
32 PRINTT$:PRINT" AVAILABLE ACCOUNTS:":PR
   INT                                :rem 215
34 PRINT" 1.HOUS-ING                  :rem 191
36 PRINT" 2.UTIL-ITIES                :rem 97
38 PRINT" 3.INSU-RANCE                :rem 80
40 PRINT" 4.BANK:PMT OR SVGS          :rem 160
42 PRINT" 5.MC/V:BANK CARDS           :rem 208
44 PRINT" 6.VACA-TION                 :rem 253
46 PRINT" 7.MEDI-CAL                  :rem 154
48 PRINT" 8.BOOK:ENTERTAINMENT        :rem 196
50 PRINT" 9.CHGE:STORE ACCTS          :rem 199
52 PRINT"10.MISC-ELLANEOUS":PRINT:rem 143
54 PRINT"11.CHBK:TOTAL/BALANCE":PRINT
                                      :rem 124
56 PRINT"FOR THE DATE, USE ANY FORMAT WIT
   HOUT COMMAS.":GOSUB500             :rem 221
80 PRINT"DEPOSITS ARE ADDED TO THE CHECKB
   OOK BALANCE AND THE MISC ACCOUNT.":PRI
   NT                                 :rem 35
82 PRINT"LEAVE THEM IN MISC OR TRANSFER T
   HEM TO OTHERACCOUNTS AS YOU WISH.":PRI
   NT                                 :rem 147
84 PRINT"YOU GET PROMPTS ALONG THE WAY.":
   PRINT                              :rem 7
86 PRINT"YOU ARE PROTECTED MOSTOF THE TIM
   E AGAINST{3 SPACES}SLIP-UPS.":PRINT
                                      :rem 127
88 PRINT"NEGATIVE BALANCES ARE ALLOWED FO
   R TEMPORARY CONVENIENCE.":GOSUB500
                                      :rem 129
100 PRINT"WHEN YOU HAVE COMPLET-ED ALL YO
    UR TRANSACT- IONS, YOU WRITE NEW
                                      :rem 105
102 PRINT"FILE BALANCES.":PRINT       :rem 178
106 PRINT"HAPPY CHECKBOOK AND{3 SPACES}BU
    DGET BALANCING!":PRINT            :rem 232
108 PRINT:PRINT                       :rem 237
109 PRINT"{HOME}{9 DOWN}"             :rem 23
110 PRINT"WOULD YOU LIKE TO RE- PEAT THE
    {SPACE}INSTRUCTIONS?              :rem 212
112 GETA$:IFA$=""THEN112              :rem 75
114 IFA$="Y"THEN32                    :rem 248
116 IFA$<>"N"THENPRINT:GOTO109        :rem 97
118 S$="LO"+CHR$(34)+"B2"+CHR$(34)+",1:"+
    CHR$(131)                         :rem 112
120 REM CHANGE 1 TO 8 IN LINE 118 IF YOU
    {SPACE}AREUSING A DISK DRIVE      :rem 82
122 FORI=1TOLEN(S$):POKE630+I,ASC(MID$(S$
    ,I)):NEXT:POKE198,I:END           :rem 140
500 PRINT:PRINT"MORE?...PRESS ANY KEY
                                      :rem 229
502 POKE36878,15:POKE36875,240:FORM=1TO30
    0:NEXT:POKE36878,0:POKE36875,0
                                      :rem 210
504 GETA$:IFA$=""THEN504              :rem 85
506 PRINT"{CLR}"T$:RETURN             :rem 145
```

Program 2: Budgeteer—VIC Main Program

```
2 X=0:REM MAKE X=0 FOR TAPE,OR X=1 TO USE
  DISK                                :rem 87
3 T$="{CLR}{2 SPACES}{GRN}{RVS} {OFF}*
  {RVS} {OFF} BUDGETEER {RVS} {OFF}*{RVS}
   {OFF}{BLU}":PRINTCHR$(14);:POKE36878,1
  5:S=36874                           :rem 145
4 DIMA$(11),A(11),B%(11):DEF FNR(X)=INT(X
  *100+.5)/100:PRINTT$:PRINT:PRINT
                                      :rem 203
5 PRINT:PRINT:INPUT"TODAY'S DATE";DD$:PRI
  NT:GOTO20                           :rem 51
6 PRINTT$:PRINT"DATE:"D$:PRINT"LAST AMT:$
  "A                                  :rem 70
7 GOSUB12:PRINT:FORR=1TO9:PRINT"{RED}"R"
  {LEFT}..{GRN}"A$(R)"..${BLU}"TAB(B%(R))
  A(R):NEXT                           :rem 236
8 PRINT"{RED}10..{GRN}"A$(10)"..${BLU}"TA
  B(B%(10))A(10):PRINT                :rem 245
9 PRINT"{RED}11..{GRN}"A$(11)".${BLU}"TAB
  (B%(11))A(11):PRINT:RETURN          :rem 230
10 POKES,212:FORM=1TO150:NEXT:POKES,0:FOR
   M=1TO100:NEXT                      :rem 211
11 POKES,201:FORM=1TO200:NEXT:POKES,0:RET
   URN                                :rem 95
```

```
12 FORR=1TO11                          :rem 15
13 IFABS(A(R))=>1THENB%(R)=16-LEN(STR$(IN
   T(ABS(A(R)))))                      :rem 153
14 IFABS(A(R))<1THENB%(R)=15           :rem 72
15 NEXT:RETURN                         :rem 191
20 FORR=1TO11:READA$(R):NEXT           :rem 229
21 DATA"HOUS","UTIL","INSU","BANK","MC/V"
                                       :rem 238
22 DATA"VACA","MEDI","BOOK","CHGE","MISC"
   ,"CHBK"                             :rem 178
25 GOSUB250                            :rem 126
28 IF X THEN OPEN1,8,2,"0:CHBKFILE,READ":
   GOTO 37                             :rem 220
30 PRINT"INSERT DATA CASSETTE{2 SPACES}AN
   D REWIND TO READ{4 SPACES}BALANCES.
                                       :rem 159
31 POKES,240:FORM=1TO300:NEXT:POKES,0
                                       :rem 75
32 PRINT:PRINT"READY?...PRESS Y        :rem 127
33 GETA$:IFA$=""THEN33                 :rem 239
34 IFA$="N"THENEND                     :rem 48
35 IFA$<>"Y"THEN30                     :rem 5
36 OPEN1,1,0,"CHBKFILE"                :rem 45
37 FORR=1TO11:INPUT#1,A(R):NEXT:INPUT#1,D
   $:CLOSE1                            :rem 80
40 GOSUB6                              :rem 26
50 PRINT"TRANSACTION?{2 SPACES}Y/N":POKES
   ,245:FORM=1TO200:NEXT               :rem 30
51 POKES,0:FORM=1TO100:NEXT:POKES,235:FOR
   M=1TO200:NEXT:POKES,0               :rem 241
52 GETA$:IFA$=""THEN52                 :rem 241
53 IFA$="Y"THEN70                      :rem 204
54 IFA$="N"THEN180                     :rem 244
55 GOSUB10:FORR=1TO3                   :rem 2
56 PRINT"{HOME}{17 DOWN}"SPC(14)"
   {3 SPACES}":FORM=1TO300:NEXT        :rem 219
58 PRINT"{HOME}{17 DOWN}"SPC(14)"Y/N":FOR
   M=1TO300:NEXT                       :rem 179
59 NEXT:GOTO52                         :rem 135
70 T=T+1:IFT=1THEND$=DD$               :rem 179
71 PRINT"{HOME}{17 DOWN}MENU: T=ACCT TRAN
   SFER                                :rem 75
72 PRINTSPC(6)"C=WRITE CHECK           :rem 238
73 PRINTSPC(6)"D=MAKE DEPOSIT          :rem 61
80 GETA$:IFA$=""THEN80                 :rem 243
81 IFA$="C"THEN100                     :rem 225
82 IFA$="D"THEN120                     :rem 229
83 IFA$="T"THEN140                     :rem 248
84 GOSUB10:FORR=1TO3                   :rem 4
85 PRINT"{HOME}{17 DOWN}"SPC(6)" ":rem 35
86 PRINTSPC(6)" ":PRINTSPC(6)" ":FORM=1TO
   300:NEXT                            :rem 175
88 PRINT"{HOME}{17 DOWN}"SPC(6)"T"
                                       :rem 250
89 PRINTSPC(6)"C":PRINTSPC(6)"D":FORM=1TO
   300:NEXT                            :rem 57
90 NEXT:GOTO80                         :rem 131
100 PRINT"AMT OF CHECK,ACCT #:":INPUTA,L
                                       :rem 222
101 IFL>10ORL<1ORL-INT(L)>0THENGOSUB10:PR
    INT"{2 UP}";:GOTO100               :rem 242
102 A(11)=FNR(A(11)-A):A(L)=FNR(A(L)-A):G
    OTO122                             :rem 61
120 PRINT"AMT OF DEPOSIT:":INPUTA :rem 56
121 L=10:A(11)=FNR(A(11)+A):A(L)=FNR(A(L)
    +A)                                :rem 86
122 GOSUB6:E=L:F=12:GOTO160            :rem 125
140 PRINT"AMT,FROM #,TO #:":INPUTA,A1,A2
                                       :rem 191
141 XH=0:IFA1>10ORA2>10ORA1<1ORA2<1ORA1-I
    NT(A1)>0ORA2-INT(A2)>0THENXH=1:rem 40
142 IFXH=1THENGOSUB10:PRINT"{2 UP}";:GOTO
    140                                :rem 180
143 A(A1)=FNR(A(A1)-A):A(A2)=FNR(A(A2)+A)
                                       :rem 166
144 GOSUB6:E=A1:F=A2                   :rem 173
160 IFE>7THENPRINT"{HOME}"SPC(100)SPC(86+
    E*22-100)"*":GOTO162               :rem 150
161 PRINT"{HOME}"SPC(86+E*22)"*" :rem 141
162 IFF>7THENPRINT"{HOME}"SPC(100)SPC(86+
    F*22-100)"*":GOTO164               :rem 156
163 PRINT"{HOME}"SPC(86+F*22)"*" :rem 144
164 POKES,232:FORM=1TO200:NEXT:POKES,0:FO
    RM=1TO100:NEXT                     :rem 11
165 POKES,232:FORM=1TO150:NEXT:POKES,0
                                       :rem 135
166 FORM=1TO750:NEXT:PRINT"{HOME}
    {16 DOWN}":GOTO50                  :rem 253
180 IFT=0THEN200                       :rem 170
181 Z=0:FORR=1TO10:Z=Z+A(R):NEXT :rem 249
182 IFABS(Z-A(11))=>.01THEN220         :rem 153
183 GOSUB 6:PRINT"ACCT BAL=CHBK BAL":GOSU
    B 250                              :rem 188
184 IF X THEN OPEN1,8,2,"@0:CHBKFILE,WRIT
    E":GOTO191                         :rem 239
185 PRINT"REWIND CASSETE TO{4 SPACES}WRIT
    E FILE.":POKES,240:FORM=1TO300:NEXT:P
    OKES,0                             :rem 93
186 PRINT:PRINT"READY?...PRESS Y       :rem 57
187 GETA$:IFA$=""THEN187               :rem 99
188 IFA$="N"THEN210                    :rem 38
189 IFA$<>"Y"THEN184                   :rem 121
190 OPEN1,1,1,"CHBKFILE"               :rem 95
191 R$=CHR$(13):FORR=1TO11:PRINT#1,A(R);R
    $;:NEXT                            :rem 122
192 PRINT#1,D$;R$;:CLOSE1              :rem 222
193 PRINTT$:PRINT"DATE:"D$:PRINT"HAD"T" T
    RANS.":GOSUB7                      :rem 132
194 PRINT"NEW FILE DONE.":POKE36878,0:END
                                       :rem 51
200 GOSUB6:PRINT"NO TRANSACTIONS.":PRINT"
    FILE NOT CHANGED.":END             :rem 252
210 GOSUB6:PRINT"BALANCES HAVE CHANGED."
                                       :rem 73
211 PRINT"WRITE NEW FILE?"             :rem 185
212 GETA$:IFA$=""THEN212               :rem 77
213 IFA$="N"THENEND                    :rem 95
214 IFA$<>"Y"THEN210                   :rem 100
215 GOTO40                             :rem 53
220 GOSUB6:PRINT"ERROR - NO BALANCE.":PRI
    NT"ACCT SUM="Z:PRINT"CHBK BALANCE="A(
    11)                                :rem 169
221 PRINT"DO YOU WISH TO":PRINT"CONTINUE?
                                       :rem 225
222 GETA$:IFA$=""THEN222               :rem 79
223 IFA$="N"THENEND                    :rem 96
224 IFA$<>"Y"THEN220                   :rem 102
225 GOTO40                             :rem 54
250 PRINT"INSERT DATA DISK OR{3 SPACES}TA
    PE. READY?(ANY KEY)"               :rem 81
251 GETA$:IFA$=""THEN251               :rem 83
253 RETURN                             :rem 122
```

Program 3: Budgeteer—64 Version

```
100 X=1:REM MAKE X=0 FOR TAPE,OR X=1 TO U
    SE DISK                            :rem 183
105 POKE 53280,12:POKE 53281,11:PRINTCHR$
    (14)                               :rem 206
110 T$="{CLR}{RVS}{7}{13 SPACES}{OFF}{8}
    {2 SPACES}BUDGETEER{2 SPACES}{RVS}{7}
    {14 SPACES}{8}"                    :rem 85
115 S=54272:FOR Q=S TO S+23:POKE Q,0:NEXT
                                       :rem 66
```

```
120 DIM A$(11),A(11),B%(11):DEF FNR(X)=IN
    T(X*100+.5)/100:PRINT T$"{6 DOWN}"
                                    :rem 70
130 PRINT"TODAY'S DATE";:GOSUB1080:INPUT
    {SPACE}DD$:PRINT:GOTO230        :rem 129
140 PRINT T$:PRINT"[8]{2 SPACES}DATE:[5]"
    D$:PRINT"[8]{2 SPACES}LAST AMOUNT:$
    [5]"A                           :rem 253
150 GOSUB190:PRINT:FOR R=1TO9:PRINT"
    {2 SPACES}[8]"R"{LEFT}.."A$(R)"..$[5]
    "TAB(B%(R))A(R):NEXT            :rem 92
160 PRINT"{2 SPACES}[8]10.."A$(10)"..$[5]
    "TAB(B%(10))A(10):PRINT         :rem 46
170 PRINT"{2 SPACES}[8]11.."A$(11)"..$[5]
    "TAB(B%(11))A(11):PRINT:RETURN:rem 77
190 FOR R=1TO11                     :rem 70
200 IF ABS(A(R))=>1 THEN B%(R)=32-LEN(STR
    $(INT(ABS(A(R)))))              :rem 197
210 IF ABS(A(R))<1 THEN B%(R)=31 :rem 116
220 NEXT:RETURN                     :rem 237
230 FOR R=1TO11:READ A$(R):NEXT   :rem 24
240 DATA"HOUSING........","UTILITIES.....
    ."                              :rem 193
243 DATA"INSURANCE......","SERVICE CHARGE
    S"                              :rem 177
247 DATA"CREDIT{SHIFT-SPACE}CARDS..."
                                    :rem 205
250 DATA"VACATION.......","MEDICAL.......
    ."                              :rem 219
253 DATA"BOOKS&MAGAZINES","STORE CHARGES.
    ."                              :rem 145
257 DATA"MISCELLANEOUS..","TOTAL
    {SHIFT-SPACE}BALANCE.."         :rem 130
270 GOSUB1050                       :rem 223
280 IF X THEN OPEN1,8,2,"0:CHBKFILE,READ"
    :GOTO 350                       :rem 58
290 PRINT"INSERT DATA CASSETTE AND REWIND
     TO READ BALANCES.              :rem 215
300 PRINT:PRINT"READY?...PRESS Y :rem 173
310 GET A$:IF A$="" THEN310         :rem 75
320 IF A$="N" THEN END              :rem 94
330 IF A$<>"Y" THEN290              :rem 107
340 OPEN1,1,0,"CHBKFILE"            :rem 91
350 FOR R=1TO11:INPUT#1,A(R):NEXT:INPUT#1
    ,D$:CLOSE1                      :rem 126
360 GOSUB140                        :rem 174
370 PRINT"[8]TRANSACTION?{2 SPACES}Y/N"
                                    :rem 225
375 GOSUB1080                       :rem 232
380 GET A$:IF A$="" THEN380         :rem 89
390 IF A$="Y" THEN450               :rem 50
400 IF A$="N" THEN740               :rem 33
410 GOSUB1160:FOR R=1TO3            :rem 148
420 PRINT"{HOME}{18 DOWN}"SPC(14)"
    {3 SPACES}":FOR M=1TO300:NEXT :rem 23
430 PRINT"{HOME}{18 DOWN}"SPC(14)"Y/N":FO
    R M=1TO300:NEXT                 :rem 238
440 NEXT:GOTO380                    :rem 229
450 T=T+1:IF T=1 THEN D$=DD$        :rem 229
460 PRINT"{HOME}{18 DOWN}MENU: T=ACCT TRA
    NSFER                           :rem 142
470 PRINTSPC(6)"C=WRITE CHECK       :rem 32
480 PRINTSPC(6)"D=MAKE DEPOSIT      :rem 111
485 GOSUB1080                       :rem 234
490 GET A$:IF A$=""THEN490          :rem 93
500 IF A$="C"THEN590                :rem 26
510 IF A$="D"THEN620                :rem 22
520 IF A$="T"THEN650                :rem 42
530 GOSUB1160:FOR R=1TO3            :rem 151
540 PRINT"{HOME}{18 DOWN}"SPC(6)" "
                                    :rem 96
550 PRINTSPC(6)" ":PRINTSPC(6)" ":FOR M=1
    TO300:NEXT                      :rem 219
560 PRINT"{HOME}{18 DOWN}"SPC(6)"T"
                                    :rem 54
570 PRINTSPC(6)"C":PRINTSPC(6)"D":FOR M=1
    TO300:NEXT                      :rem 100
580 NEXT:GOTO490                    :rem 236
590 PRINT"{HOME}{21 DOWN}"          :rem 231
591 PRINT"AMT OF CHECK,ACCT #";:GOSUB1080
    :INPUT A,L                      :rem 112
600 IF L>10 OR L<1 OR L-INT(L)>0 THEN GOS
    UB1160:GOTO590                  :rem 2
610 A(11)=FNR(A(11)-A):A(L)=FNR(A(L)-A):G
    OTO640                          :rem 70
620 PRINT:PRINT"AMT OF DEPOSIT";:GOSUB108
    0:INPUT A                       :rem 136
630 L=10:A(11)=FNR(A(11)+A):A(L)=FNR(A(L)
    +A)                             :rem 91
640 GOSUB140:E=L:F=12:GOTO690       :rem 233
650 PRINT"{HOME}{21 DOWN}"          :rem 228
651 PRINT"AMT,FROM #,TO #";:GOSUB1080:INP
    UT A,A1,A2                      :rem 74
653 IF A1>10 OR A1<1 OR A1-INT(A1)>0 THEN
     GOSUB1160:GOTO650              :rem 159
660 IF A2>10 OR A2<1 OR A2-INT(A2)>0 THEN
     GOSUB1160:GOTO650              :rem 161
670 A(A1)=FNR(A(A1)-A):A(A2)=FNR(A(A2)+A)
                                    :rem 171
680 GOSUB140:E=A1:F=A2              :rem 17
690 IF E>6 THEN PRINT"{HOME}"SPC(255)SPC(
    198)SPC(E*40-255)"*":GOTO710 :rem 242
700 PRINT"{HOME}"SPC(198)SPC(E*40)"*"
                                    :rem 204
710 IF F>6 THEN PRINT"{HOME}"SPC(255)SPC(
    198)SPC(F*40-255)"*":GOTO730 :rem 239
720 PRINT"{HOME}"SPC(198)SPC(F*40)"*"
                                    :rem 207
730 FOR M=1TO750:NEXT:PRINT"{HOME}
    {17 DOWN}":GOTO370              :rem 64
740 IF T=0 THEN870                  :rem 185
750 Z=0:FOR R=1TO10:Z=Z+A(R):NEXT:rem 251
760 IF ABS(Z-A(11))=>.01 THEN940 :rem 164
770 GOSUB 140:PRINT"SUM OF ACCOUNTS=TOTAL
     BALANCE":GOSUB 1000            :rem 202
780 IF X THEN OPEN1,8,2,"@0:CHBKFILE,WRIT
    E":GOTO840                      :rem 242
790 PRINT:PRINT"READY?...PRESS Y   :rem 58
800 GET A$:IF A$=""THEN800          :rem 83
810 IF A$="N" THEN880               :rem 43
820 IF A$<>"Y" THEN780              :rem 115
830 OPEN1,1,1,"CHBKFILE"            :rem 96
840 R$=CHR$(13):FOR R=1TO11:PRINT#1,A(R);
    R$;:NEXT                        :rem 123
850 PRINT#1,D$;R$;:CLOSE1           :rem 223
855 PRINT T$:PRINT"DATE:"D$:PRINT"HAD"T"
    {SPACE}TRANS.":GOSUB150         :rem 232
860 PRINT"NEW FILE DONE.":END       :rem 94
870 GOSUB140:PRINT"NO TRANSACTIONS.":PRIN
    T"FILE NOT CHANGED.":END        :rem 104
880 GOSUB140:PRINT"BALANCES HAVE CHANGED.
    "                               :rem 181
890 PRINT"WRITE NEW FILE?"          :rem 198
900 GET A$:IF A$="" THEN900         :rem 85
910 IF A$="N" THEN END              :rem 99
920 IF A$<>"Y" THEN880              :rem 117
930 GOTO360                         :rem 110
935 GOSUB140:PRINT"ERROR - NO BALANCE.":P
    RINT"ACCT SUM="Z                :rem 219
940 PRINT"CHBK BALANCE="A(11)       :rem 157
950 PRINT"DO YOU WISH TO CONTINUE?":rem 1
960 GET A$:IF A$="" THEN960         :rem 97
970 IF A$="N" THENEND               :rem 105
980 IF A$<>"Y" THEN940              :rem 120
```

```
990 GOTO360                          :rem 116
1000 PRINT"INSERT DATA DISK OR TAPE"
                                     :rem 247
1002 PRINT"PRESSING 'STOP' WILL ABORT SES
     SION"                           :rem 231
1005 PRINT" (TRANSACTIONS WILL BE LOST)
                                     :rem 96
1008 PRINT" ANY OTHER KEY WILL SAVE DATA.
     "                               :rem 156
1009 GOSUB1080                        :rem 19
1010 GET A$:IF A$="" THEN1010        :rem 167
1030 RETURN                          :rem 164
1050 PRINT"INSERT DATA DISK OR TAPE"
                                     :rem 252
1055 PRINT"PRESS ANY KEY TO LOAD DATA."
                                     :rem 133
1058 GOSUB1080                        :rem 23
1060 GET A$:IF A$="" THEN1060        :rem 177
1070 RETURN                          :rem 168
1080 FOR Q=S TO S+22:POKE Q,0:NEXT
                                     :rem 165
1090 POKE S+5,0:POKE S+19,0          :rem 181
1095 POKE S+6,7:POKE S+20,7          :rem 193
1100 POKE S+24,15                    :rem 103
1110 POKE S+4,33:POKES+18,19          :rem 28
1120 POKE S,0:POKE S+1,75             :rem 82
1130 POKE S+14,1:POKE S+15,75         :rem 25
1135 POKE S+4,32:POKES+18,18          :rem 33
1140 FOR Q=1TO150:NEXT                :rem 30
1150 POKE S+1,0:POKE S+15,0:RETURN
                                     :rem 196
1160 FOR Q=S TO S+22:POKE Q,0:NEXT
                                     :rem 164
1170 POKE S+5,15:POKE S+12,15         :rem 25
1175 POKE S+3,4:POKE3+10,4           :rem 150
1180 POKE S+24,6                      :rem 63
1190 POKE S+4,65:POKES+18,65          :rem 42
1200 POKE S+1,12:POKE S+8,14         :rem 224
1210 FOR Q=1TO250:NEXT                :rem 29
1220 POKE S+1,0:POKE S+8,0:RETURN:rem 148
```

Function Key

(Article on page 160.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1:
Function Key—64 Version

```
10 I=51712:SH=INT(I/256):SL=I-SH*256
                                     :rem 56
20 READ A:CK=CK+A:IF A=256 THEN 40:rem 53
25 IF A<0 THEN 100                   :rem 99
30 POKE I,A:I=I+1:GOTO 20           :rem 130
40 IFCK<>28195THENPRINT"ERROR IN DATA":ST
   OP                                :rem 191
50 PRINT"USE SYS"SH*256+SL+403"TO START":
   END                               :rem 150
100 IF A<-255 THEN A=ABS(A+256)+SH:GOTO 3
    0                                :rem 223
110 A=ABS(A+1)+SL:GOTO30             :rem 116
49152 DATA 0,0,0,0,0,0                :rem 27
49158 DATA 0,0,0,0,0,0                :rem 33
49164 DATA 0,0,0,0,0,0                :rem 30
49170 DATA 0,0,0,0,0,0                :rem 27
49176 DATA 0,0,0,0,0,0                :rem 33
49182 DATA 0,0,0,0,0,0                :rem 30
49188 DATA 0,0,0,0,0,0                :rem 36
49194 DATA 0,0,0,0,0,0                :rem 33
49200 DATA 0,0,0,0,0,0                :rem 21
49206 DATA 0,0,0,0,0,0                :rem 27
49212 DATA 0,0,0,0,0,0                :rem 24
49218 DATA 0,0,0,0,0,0                :rem 30
49224 DATA 0,0,0,0,0,0                :rem 27
49230 DATA 0,0,0,0,0,0                :rem 24
49236 DATA 0,0,0,0,0,0                :rem 30
49242 DATA 0,0,0,0,0,0                :rem 27
49248 DATA 0,0,0,0,0,0                :rem 33
49254 DATA 0,0,0,0,0,0                :rem 30
49260 DATA 0,0,0,0,0,0                :rem 27
49266 DATA 0,0,0,0,0,0                :rem 33
49272 DATA 0,0,0,0,0,0                :rem 30
49278 DATA 0,0,0,173,-1,-256          :rem 87
49284 DATA 240,30,166,198,224,11     :rem 51
49290 DATA 176,24,168,185,-1,-256:rem 103
49296 DATA 240,15,157,119,2,230     :rem 255
49302 DATA 198,238,-1,-256,173,-1 :rem 88
49308 DATA -256,41,15,208,3,141    :rem 246
49314 DATA -1,-256,108,-146,-257,32
                                    :rem 180
49320 DATA 72,235,173,-1,-256,208 :rem 88
49326 DATA 34,165,157,240,30,165    :rem 51
49332 DATA 212,208,26,166,198,202:rem 101
49338 DATA 189,119,2,201,133,144    :rem 51
49344 DATA 16,201,141,176,12,56    :rem 250
49350 DATA 233,133,10,10,10,10     :rem 174
49356 DATA 9,1,141,-1,-256,96      :rem 152
49362 DATA 166,122,189,0,2,201     :rem 199
49368 DATA 70,208,68,232,189,0     :rem 220
49374 DATA 2,201,49,144,60,201     :rem 197
49380 DATA 57,176,59,41,15,168     :rem 224
49386 DATA 185,-135,-257,168,232,189
                                     :rem 11
49392 DATA 0,2,201,61,240,5          :rem 40
49398 DATA 162,11,108,0,3,232      :rem 149
49404 DATA 189,0,2,201,13,240      :rem 140
49410 DATA 15,201,95,208,2,169     :rem 203
49416 DATA 13,153,-1,-256,200,152 :rem 77
49422 DATA 41,15,208,233,169,0     :rem 200
49428 DATA 153,-1,-256,160,107,32 :rem 86
49434 DATA 47,241,108,2,3,108      :rem 151
49440 DATA -144,-257,208,251,232,189
                                    :rem 247
49446 DATA 0,2,201,61,208,202      :rem 139
49452 DATA 232,138,72,160,0,189      :rem 3
49458 DATA 0,2,201,44,240,8          :rem 47
49464 DATA 232,200,192,15,208,243 :rem 95
49470 DATA 240,182,192,0,208,4     :rem 201
49476 DATA 162,8,208,176,232,189   :rem 70
49482 DATA 0,2,201,49,240,8          :rem 49
49488 DATA 201,56,240,4,162,9      :rem 161
49494 DATA 208,160,41,15,170,152   :rem 48
49500 DATA 72,160,0,138,32,186     :rem 200
49506 DATA 255,104,168,104,170,152
                                    :rem 147
49512 DATA 160,2,32,189,255,162      :rem 0
49518 DATA -1,134,251,169,-256,133
                                    :rem 144
49524 DATA 252,160,-257,169,251,162
                                    :rem 202
49530 DATA -227,32,216,255,169,13 :rem 97
49536 DATA 32,210,255,76,116,164   :rem 53
```

```
49542 DATA 0,1,65,17,81,33          :rem 1
49548 DATA 97,49,113,124,165,49    :rem 22
49554 DATA 234,162,-256,173,5,3     :rem 0
49560 DATA 201,-256,240,17,141,-145
                                  :rem 182
49566 DATA -257,173,4,3,141,-144  :rem 45
49572 DATA -257,169,-211,141,4,3  :rem 42
49578 DATA 142,5,3,173,21,3        :rem 55
49584 DATA 201,-256,240,19,141,-147
                                  :rem 192
49590 DATA -257,173,20,3,141,-146 :rem 90
49596 DATA -257,169,-130,120,141,20
                                  :rem 190
49602 DATA 3,142,21,3,88,173      :rem 102
49608 DATA 144,2,201,-256,240,19  :rem 41
49614 DATA 141,-170,-256,173,143,2
                                  :rem 136
49620 DATA 141,-169,-256,169,-168,120
                                   :rem 39
49626 DATA 141,143,2,142,144,2   :rem 195
49632 DATA 88,96,256             :rem 246
```

Program 2:
Function Key—VIC Version

```
10 I=PEEK(55)+256*PEEK(56)-512:SH=INT(I/2
   56):SL=I-SH*256                :rem 176
20 READ A:CK=CK+A:IF A=256 THEN 40:rem 53
25 IF A<0 THEN 100                 :rem 99
30 POKE I,A:I=I+1:GOTO 20         :rem 130
40 IFCK<>28410THENPRINT"ERROR IN DATA":ST
   OP                             :rem 181
50 PRINT"USE SYS"SH*256+SL+403"TO START":
   POKE55,SL:POKE56,SH:END        :rem 207
100 IF A<-255 THEN A=ABS(A+256)+SH:GOTO 3
    0                             :rem 223
110 A=ABS(A+1)+SL:GOTO30          :rem 116
49152 DATA 0,0,0,0,0,0             :rem 27
49158 DATA 0,0,0,0,0,0             :rem 33
49164 DATA 0,0,0,0,0,0             :rem 30
49170 DATA 0,0,0,0,0,0             :rem 27
49176 DATA 0,0,0,0,0,0             :rem 33
49182 DATA 0,0,0,0,0,0             :rem 30
49188 DATA 0,0,0,0,0,0             :rem 36
49194 DATA 0,0,0,0,0,0             :rem 33
49200 DATA 0,0,0,0,0,0             :rem 21
49206 DATA 0,0,0,0,0,0             :rem 27
49212 DATA 0,0,0,0,0,0             :rem 24
49218 DATA 0,0,0,0,0,0             :rem 30
49224 DATA 0,0,0,0,0,0             :rem 27
49230 DATA 0,0,0,0,0,0             :rem 24
49236 DATA 0,0,0,0,0,0             :rem 30
49242 DATA 0,0,0,0,0,0             :rem 27
49248 DATA 0,0,0,0,0,0             :rem 33
49254 DATA 0,0,0,0,0,0             :rem 30
49260 DATA 0,0,0,0,0,0             :rem 27
49266 DATA 0,0,0,0,0,0             :rem 33
49272 DATA 0,0,0,0,0,0             :rem 30
49278 DATA 0,0,0,173,-1,-256       :rem 87
49284 DATA 240,30,166,198,224,11  :rem 51
49290 DATA 176,24,168,185,-1,-256:rem 103
49296 DATA 240,15,157,119,2,230  :rem 255
49302 DATA 198,238,-1,-256,173,-1 :rem 88
49308 DATA -256,41,15,208,3,141  :rem 246
49314 DATA -1,-256,108,-146,-257,32
                                  :rem 180
49320 DATA 72,235,173,-1,-256,208 :rem 88
49326 DATA 34,165,157,240,30,165  :rem 51
49332 DATA 212,208,26,166,198,202:rem 101
49338 DATA 189,119,2,201,133,144  :rem 51
49344 DATA 16,201,141,176,12,56  :rem 250
49350 DATA 233,133,10,10,10,10   :rem 174
49356 DATA 9,1,141,-1,-256,96    :rem 152
49362 DATA 166,122,189,0,2,201   :rem 199
49368 DATA 70,208,68,232,189,0   :rem 220
49374 DATA 2,201,49,144,60,201   :rem 197
49380 DATA 57,176,59,41,15,168   :rem 224
49386 DATA 185,-135,-257,168,232,189
                                   :rem 11
49392 DATA 0,2,201,61,240,5        :rem 40
49398 DATA 162,11,108,0,3,232    :rem 149
49404 DATA 189,0,2,201,13,240    :rem 140
49410 DATA 15,201,95,208,2,169   :rem 203
49416 DATA 13,153,-1,-256,200,152 :rem 77
49422 DATA 41,15,208,233,169,0   :rem 200
49428 DATA 153,-1,-256,160,107,32 :rem 86
49434 DATA 230,241,108,2,3,108   :rem 193
49440 DATA -144,-257,208,251,232,189
                                  :rem 247
49446 DATA 0,2,201,61,208,202    :rem 139
49452 DATA 232,138,72,160,0,189     :rem 3
49458 DATA 0,2,201,44,240,8        :rem 47
49464 DATA 232,200,192,15,208,243 :rem 95
49470 DATA 240,182,192,0,208,4   :rem 201
49476 DATA 162,8,208,176,232,189  :rem 70
49482 DATA 0,2,201,49,240,8        :rem 49
49488 DATA 201,56,240,4,162,9    :rem 161
49494 DATA 208,160,41,15,170,152  :rem 48
49500 DATA 72,160,0,138,32,186   :rem 200
49506 DATA 255,104,168,104,170,152
                                  :rem 147
49512 DATA 160,2,32,189,255,162     :rem 0
49518 DATA -1,134,251,169,-256,133
                                  :rem 144
49524 DATA 252,160,-257,169,251,162
                                  :rem 202
49530 DATA -227,32,216,255,169,13 :rem 97
49536 DATA 32,210,255,76,116,196  :rem 58
49542 DATA 0,1,65,17,81,33          :rem 1
49548 DATA 97,49,113,124,165,49   :rem 22
49554 DATA 234,162,-256,173,5,3     :rem 0
49560 DATA 201,-256,240,17,141,-145
                                  :rem 182
49566 DATA -257,173,4,3,141,-144  :rem 45
49572 DATA -257,169,-211,141,4,3  :rem 42
49578 DATA 142,5,3,173,21,3        :rem 55
49584 DATA 201,-256,240,19,141,-147
                                  :rem 192
49590 DATA -257,173,20,3,141,-146 :rem 90
49596 DATA -257,169,-130,120,141,20
                                  :rem 190
49602 DATA 3,142,21,3,88,173      :rem 102
49608 DATA 144,2,201,-256,240,19  :rem 41
49614 DATA 141,-170,-256,173,143,2
                                  :rem 136
49620 DATA 141,-169,-256,169,-168,120
                                   :rem 39
49626 DATA 141,143,2,142,144,2   :rem 195
49632 DATA 88,96,256             :rem 246
```

Disk Auto Load For The 64

(Article on page 164.)

```
5 PRINT"{CLR} PLEASE WAIT..."      :rem 18
10 B=679:C=767:TT=0                :rem 51
20 FORA=BTOC:READD:TT=TT+D:POKEA,D:NEXT
                                   :rem 82
```

```
25 IFTT<>8554THENPRINT"CHECK DATA STATEME
   NTS";B;"TO";C:END                :rem 156
30 B=7168:C=7623:TT=0               :rem 147
40 FORA=BTOC:READD:TT=TT+D:POKEA,D:NEXT
                                    :rem 84
45 IFTT<>42577THENPRINT"CHECK DATA STATEM
   ENTS";B;"TO";C:END               :rem 209
50 PRINT "{CLR}{DOWN} AUTO-LOAD A {RVS}B
   {OFF}ASIC OR {RVS}M{OFF}ACHINE LANGUAG
   E{3 SPACES}PROGRAM?"             :rem 124
70 GETA$:IFA$=""THEN70              :rem 241
80 IFA$="M"THENGOSUB300             :rem 108
299 SYS7168:END                     :rem 138
300 PRINT"{CLR}{DOWN} ENTER STARTING ADDR
    ESS OF MACHINE LANG. PROGRAM.":rem 24
330 INPUTN:IFN<0ORN>65535THEN300 :rem 238
340 NN=INT(N/256):POKE722,N-(NN*256):POKE
    723,NN:POKE721,32               :rem 134
345 POKE693,1                       :rem 202
350 POKE718,32:POKE719,66:POKE720,166:POK
    E724,76:POKE725,116:POKE726,164:RETUR
    N                               :rem 184
679 DATA169,131,141,2,3,169,164,141
                                    :rem 245
687 DATA3,3,169,8,170,160,0,32      :rem 245
695 DATA186,255,169,2,162,239,160,2
                                    :rem 255
703 DATA32,189,255,169,0,166,43,164
                                    :rem 250
711 DATA44,32,213,255,32,231,255,165
                                    :rem 25
719 DATA174,133,45,133,47,165,175,133
                                    :rem 93
727 DATA46,133,48,234,169,82,141,119
                                    :rem 47
735 DATA2,169,213,141,120,2,169,13
                                    :rem 180
743 DATA141,121,2,169,3,133,198,96
                                    :rem 195
751 DATA0,0,0,0,0,0,0,0             :rem 107
759 DATA0,0,0,0,0,0,0,0,0           :rem 207
7168 DATA162,0,189,171,28,32,210,255
                                    :rem 38
7176 DATA232,224,98,208,245,162,0,32
                                    :rem 38
7184 DATA207,255,201,13,240,8,157,239
                                    :rem 87
7192 DATA2,232,224,16,208,241,142,186
                                    :rem 80
7200 DATA2,162,0,189,13,29,32,210:rem 123
7208 DATA255,232,224,59,208,245,162,0
                                    :rem 86
7216 DATA160,0,232,234,208,252,200,208
                                    :rem 116
7224 DATA249,165,197,201,64,240,250,169
                                    :rem 195
7232 DATA0,133,198,162,0,189,74,29
                                    :rem 198
7240 DATA32,210,255,232,224,85,208,245
                                    :rem 128
7248 DATA162,0,32,207,255,201,13,240
                                    :rem 19
7256 DATA8,157,200,29,232,224,16,208
                                    :rem 36
7264 DATA241,142,111,28,169,167,141,2
                                    :rem 82
7272 DATA3,169,2,141,3,3,169,0      :rem 241
7280 DATA162,200,160,29,32,189,255,169
                                    :rem 143
7288 DATA8,170,160,255,32,186,255,169
                                    :rem 106
7296 DATA167,133,251,169,2,133,252,169
                                    :rem 149
7304 DATA251,162,4,160,3,32,216,255
                                    :rem 229
7312 DATA32,231,255,169,131,141,2,3
                                    :rem 226
7320 DATA169,164,141,3,3,162,0,189
                                    :rem 188
7328 DATA159,29,32,210,255,232,224,41
                                    :rem 84
7336 DATA208,245,96,147,17,32,69,78
                                    :rem 12
7344 DATA84,69,82,32,78,65,77,69 :rem 129
7352 DATA32,79,70,32,13,80,82,79 :rem 102
7360 DATA71,82,65,77,32,84,72,65 :rem 110
7368 DATA84,32,73,83,32,84,79,32 :rem 114
7376 DATA66,69,13,65,85,84,79,77 :rem 134
7384 DATA65,84,73,67,65,76,76,89 :rem 136
7392 DATA32,66,79,79,84,69,68,46 :rem 135
7400 DATA13,17,32,77,65,88,73,77 :rem 107
7408 DATA85,77,32,76,69,78,71,84 :rem 128
7416 DATA72,32,61,32,49,54,13,67  :rem 97
7424 DATA72,65,82,65,67,84,69,82 :rem 122
7432 DATA83,46,17,17,13,147,17,80:rem 147
7440 DATA76,65,67,69,32,78,69,87 :rem 131
7448 DATA76,89,32,70,79,82,77,65 :rem 130
7456 DATA84,84,69,68,13,32,68,73 :rem 122
7464 DATA83,75,32,73,78,32,68,73 :rem 117
7472 DATA83,75,32,68,82,73,86,69 :rem 125
7480 DATA44,13,84,72,69,78,32,80 :rem 109
7488 DATA82,69,83,83,32,70,49,46 :rem 123
7496 DATA17,13,147,17,32,69,78,84:rem 167
7504 DATA69,82,32,78,65,77,69,32 :rem 120
7512 DATA79,70,32,66,79,79,84,13 :rem 117
7520 DATA80,82,79,71,46,32,157,84:rem 158
7528 DATA72,69,78,32,80,82,69,83 :rem 124
7536 DATA83,13,82,69,84,85,82,78 :rem 125
7544 DATA46,17,13,32,77,65,88,73 :rem 112
7552 DATA77,85,77,32,76,69,78,71 :rem 130
7560 DATA84,72,32,61,32,49,54,13  :rem 96
7568 DATA32,67,72,65,82,65,67,84 :rem 124
7576 DATA69,82,83,46,17,17,13,147:rem 165
7584 DATA17,32,18,84,85,82,78,32 :rem 115
7592 DATA67,79,77,80,85,84,69,82 :rem 138
7600 DATA32,79,70,70,47,79,78,13 :rem 108
7608 DATA84,79,32,82,69,83,69,84 :rem 131
7616 DATA32,86,69,67,84,79,82,83 :rem 130
```

MLX

(Article on page 167.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

Program 1: MLX—VIC Version

```
10 REM LINES CHANGED FROM VIC MLX VERSION
   2.00 ARE 581,582,765             :rem 166
100 PRINT"{CLR}{PUR}";CHR$(142);CHR$(8);
                                    :rem 181
101 POKE 788,194:REM DISABLE RUN/STOP
                                    :rem 174
```

```
110 PRINT"{RVS}{14 SPACES}"          :rem 117
120 PRINT"{RVS} {RIGHT}{OFF}[*]£{RVS}
    {RIGHT} {RIGHT}{2 SPACES}[*]{OFF}[*]
    £{RVS}£{RVS} "                   :rem 191
130 PRINT"{RVS} {RIGHT} [G]{RIGHT}
    {2 RIGHT} {OFF}£{RVS}£[*]{OFF}[*]
    {RVS} "                          :rem 232
140 PRINT"{RVS}{14 SPACES}"          :rem 120
200 PRINT"{2 DOWN}{PUR}{BLK}MACHINE LANGU
    AGE":PRINT"EDITOR VER 2.02{5 DOWN}"
                                     :rem 192
210 PRINT"{BLK}{3 UP}STARTING ADDRESS":IN
    PUTS:F=1-F:C$=CHR$(31+119*F)     :rem 97
220 IFS<256ORS>32767THENGOSUB3000:GOTO210
                                      :rem 2
225 PRINT:PRINT:PRINT:PRINT          :rem 123
230 PRINT"{BLK}{3 UP}ENDING ADDRESS":INPU
    TE:F=1-F:C$=CHR$(31+119*F)       :rem 158
240 IFE<256ORE>32767THENGOSUB3000:GOTO230
                                     :rem 234
250 IFE<STHENPRINTC$;"{RVS}ENDING < START
    {2 SPACES}":GOSUB1000:GOTO 230
                                     :rem 176
260 PRINT:PRINT:PRINT                :rem 179
300 PRINT"{CLR}";CHR$(14):AD=S       :rem 56
310 A=1:PRINTRIGHT$("0000"+MID$(STR$(AD),
    2),5);":";                       :rem 33
315 FOR J=A TO 6                     :rem 33
320 GOSUB570:IFN=-1THENJ=J+N:GOTO320
                                     :rem 228
390 IFN=-211THEN 710                 :rem 62
400 IFN=-204THEN 790                 :rem 64
410 IFN=-206THENPRINT:INPUT"{DOWN}ENTER N
    EW ADDRESS";ZZ                   :rem 44
415 IFN=-206THENIFZZ<SORZZ>ETHENPRINT"
    {RVS}OUT OF RANGE":GOSUB1000:GOTO410
                                     :rem 225
417 IFN=-206THENAD=ZZ:PRINT:GOTO310
                                     :rem 238
420 IF N<>-196 THEN 480              :rem 133
430 PRINT:INPUT"DISPLAY:FROM";F:PRINT,"TO
    ";:INPUTT                        :rem 234
440 IFF<SORF>EORT<SORT>ETHENPRINT"AT LEAS
    T";S;"{LEFT}, NOT MORE THAN";E:GOTO43
    0                                :rem 159
450 FORI=FTOTSTEP6:PRINT:PRINTRIGHT$("000
    0"+MID$(STR$(I),2),5);":";       :rem 30
455 FORK=0TO5:N=PEEK(I+K):IFK=3THENPRINTS
    PC(10);                          :rem 34
457 PRINTRIGHT$("00"+MID$(STR$(N),2),3);"
    ,";                              :rem 157
460 GETA$:IFA$>""THENPRINT:PRINT:GOTO310
                                     :rem 25
470 NEXTK:PRINTCHR$(20);:NEXTI:PRINT:PRIN
    T:GOTO310                        :rem 50
480 IFN<0 THEN PRINT:GOTO310         :rem 168
490 A(J)=N:NEXTJ                     :rem 199
500 CKSUM=AD-INT(AD/256)*256:FORI=1TO6:CK
    SUM=(CKSUM+A(I))AND255:NEXT      :rem 200
510 PRINTCHR$(18);:GOSUB570:PRINTCHR$(146
    );                               :rem 94
511 IFN=-1THENA=6:GOTO315            :rem 254
515 PRINTCHR$(20):IFN=CKSUMTHEN530
                                     :rem 122
520 PRINT:PRINT"LINE ENTERED WRONG":PRINT
    "RE-ENTER":PRINT:GOSUB1000:GOTO310
                                     :rem 129
530 GOSUB2000                        :rem 218
540 FORI=1TO6:POKEAD+I-1,A(I):NEXT:rem 80
550 AD=AD+6:IF AD<E THEN 310         :rem 212
560 GOTO 710                         :rem 108
570 N=0:Z=0                          :rem 88
580 PRINT"[+]";                      :rem 79
581 GETA$:IFA$=""THEN581             :rem 95
582 AV=-(A$="M")-2*(A$=",")-3*(A$=".")-4*
    (A$="J")-5*(A$="K")-6*(A$="L"):rem 41
583 AV=AV-7*(A$="U")-8*(A$="I")-9*(A$="O"
    ):IFA$="H"THENA$="0"             :rem 134
584 IFAV>0THENA$=CHR$(48+AV)         :rem 134
585 PRINTCHR$(20);:A=ASC(A$):IFA=13ORA=44
    ORA=32THEN670                    :rem 229
590 IFA>128THENN=-A:RETURN           :rem 137
600 IFA<>20 THEN 630                 :rem 10
610 PRINTCHR$(146);:GOSUB690:IFI=1ANDT=44
    THENN=-1:PRINT"{LEFT} {LEFT}";:GOTO69
    0                                :rem 155
620 GOTO570                          :rem 109
630 IFA<48ORA>57THEN580              :rem 105
640 PRINTA$;:N=N*10+A-48             :rem 106
650 IFN>255 THEN A=20:GOSUB1000:GOTO600
                                     :rem 229
660 Z=Z+1:IFZ<3THEN580                :rem 71
670 IFZ=0THENGOSUB1000:GOTO570       :rem 114
680 PRINT",";:RETURN                 :rem 240
690 S%=PEEK(209)+256*PEEK(210)+PEEK(211)
                                     :rem 149
692 FORI=1TO3:T=PEEK(S%-I)            :rem 68
695 IFT<>44ANDT<>58THENPOKES%-I,32:NEXT
                                     :rem 205
700 PRINTLEFT$("{3 LEFT}",I-1);:RETURN
                                      :rem 7
710 PRINT"{CLR}{RVS}*** SAVE ***{3 DOWN}"
                                     :rem 236
720 F$="":INPUT"{DOWN} FILENAME";F$:IFF$=
    ""THEN310                        :rem 128
730 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
     {RVS}D{OFF}ISK: (T/D)"          :rem 228
740 GETA$:IFA$<>"T"ANDA$<>"D"THEN740
                                     :rem 36
750 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$:
    OPEN15,8,15,"S"+F$:CLOSE15       :rem 212
760 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$
    ):POKE782,ZK/256                  :rem 3
762 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
    T$):SYS65469                     :rem 109
763 POKE780,1:POKE781,DV:POKE782,1:SYS654
    66                               :rem 69
765 K=S:POKE254,K/256:POKE253,K-PEEK(254)
    *256:POKE780,253                 :rem 17
766 K=E+1:POKE782,K/256:POKE781,K-PEEK(78
    2)*256:SYS65496                  :rem 235
770 IF(PEEK(783)AND1)OR(191ANDST)THEN780
                                     :rem 111
775 PRINT"{DOWN}DONE.":GOTO310       :rem 96
780 PRINT"{DOWN}ERROR ON SAVE.{2 SPACES}T
    RY AGAIN.":IFDV=1THEN720         :rem 171
781 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTE1$
    ;E2$:CLOSE15:GOTO720             :rem 103
782 GOTO720                          :rem 115
790 PRINT"{CLR}{RVS}*** LOAD ***{2 DOWN}"
                                     :rem 212
800 F$="":INPUT"{2 DOWN} FILENAME";F$:IFF
    $=""THEN310                      :rem 144
810 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
     {RVS}D{OFF}ISK: (T/D)"          :rem 227
820 GETA$:IFA$<>"T"ANDA$<>"D"THEN820
                                     :rem 34
830 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$
                                     :rem 157
840 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$
    ):POKE782,ZK/256                  :rem 2
```

```
841 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
    T$):SYS65469                    :rem 107
845 POKE780,1:POKE781,DV:POKE782,1:SYS654
    66                              :rem 70
850 POKE780,0:SYS65493              :rem 11
860 IF(PEEK(783)AND1)OR(191ANDST)THEN870
                                    :rem 111
865 PRINT"{DOWN}DONE.":GOTO310      :rem 96
870 PRINT"{DOWN}ERROR ON LOAD.{2 SPACES}T
    RY AGAIN.{DOWN}":IFDV=1THEN800
                                    :rem 172
880 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTE1$
    ;E2$:CLOSE15:GOTO800            :rem 102
1000 REM BUZZER                     :rem 135
1001 POKE36878,15:POKE36874,190     :rem 206
1002 FORW=1TO300:NEXTW              :rem 117
1003 POKE36878,0:POKE36874,0:RETURN
                                    :rem 74
2000 REM BELL SOUND                 :rem 78
2001 FORW=15TO0STEP-1:POKE36878,W:POKE368
     76,240:NEXTW                   :rem 22
2002 POKE36876,0:RETURN             :rem 119
3000 PRINTC$;"{RVS}NOT ZERO PAGE OR ROM":
     GOTO1000                       :rem 89
```

Program 2: MLX—64 Version

```
10 REM LINES CHANGED FROM MLX VERSION 2.0
   0 ARE 750,765,770 AND 860        :rem 50
20 REM LINE CHANGED FROM MLX VERSION 2.01
    IS 300                          :rem 147
100 PRINT"{CLR}[6]";CHR$(142);CHR$(8);:PO
    KE53281,1:POKE53280,1           :rem 67
101 POKE 788,52:REM DISABLE RUN/STOP
                                    :rem 119
110 PRINT"{RVS}{39 SPACES}";        :rem 176
120 PRINT"{RVS}{14 SPACES}{RIGHT}{OFF}[*]
    £{RVS}{RIGHT} {RIGHT}{2 SPACES}[*]
    {OFF}[*]£{RVS}£{RVS}{14 SPACES}";
                                    :rem 250
130 PRINT"{RVS}{14 SPACES}{RIGHT} [G]
    {RIGHT} {2 RIGHT} {OFF}£{RVS}£[*]
    {OFF}[*]{RVS}{14 SPACES}";      :rem 35
140 PRINT"{RVS}{41 SPACES}"         :rem 120
200 PRINT"{2 DOWN}{PUR}{BLK} MACHINE LANG
    UAGE EDITOR VERSION 2.02{5 DOWN}"
                                    :rem 238
210 PRINT"[5]{2 UP}STARTING ADDRESS?
    {8 SPACES}{9 LEFT}";            :rem 143
215 INPUTS:F=1-F:C$=CHR$(31+119*F)
                                    :rem 166
220 IFS<256OR(S>40960ANDS<49152)ORS>53247
    THENGOSUB3000:GOTO210           :rem 235
225 PRINT:PRINT:PRINT               :rem 180
230 PRINT"[5]{2 UP}ENDING ADDRESS?
    {8 SPACES}{9 LEFT}";:INPUTE:F=1-F:C$=
    CHR$(31+119*F)                  :rem 20
240 IFE<256OR(E>40960ANDE<49152)ORE>53247
    THENGOSUB3000:GOTO230           :rem 183
250 IFE<STHENPRINTC$;"{RVS}ENDING < START
    {2 SPACES}":GOSUB1000:GOTO 230
                                    :rem 176
260 PRINT:PRINT:PRINT               :rem 179
300 PRINT"{CLR}";CHR$(14):AD=S      :rem 56
310 A=1:PRINTRIGHT$("0000"+MID$(STR$(AD),
    2),5);":";                      :rem 33
315 FORJ=ATO6                       :rem 33
320 GOSUB570:IFN=-1THENJ=J+N:GOTO320
                                    :rem 228
390 IFN=-211THEN 710                :rem 62
400 IFN=-204THEN 790                :rem 64
410 IFN=-206THENPRINT:INPUT"{DOWN}ENTER N
    EW ADDRESS";ZZ                  :rem 44
415 IFN=-206THENIFZZ<SORZZ>ETHENPRINT"
    {RVS}OUT OF RANGE":GOSUB1000:GOTO410
                                    :rem 225
417 IFN=-206THENAD=ZZ:PRINT:GOTO310
                                    :rem 238
420 IF N<>-196 THEN 480             :rem 133
430 PRINT:INPUT"DISPLAY:FROM";F:PRINT,"TO
    ";:INPUTT                       :rem 234
440 IFF<SORF>EORT<SORT>ETHENPRINT"AT LEAS
    T";S;"{LEFT}, NOT MORE THAN";E:GOTO43
    0                               :rem 159
450 FORI=FTOTSTEP6:PRINT:PRINTRIGHT$("000
    0"+MID$(STR$(I),2),5);":";      :rem 30
451 FORK=0TO5:N=PEEK(I+K):PRINTRIGHT$("00
    "+MID$(STR$(N),2),3);",";       :rem 66
460 GETA$:IFA$>""THENPRINT:PRINT:GOTO310
                                    :rem 25
470 NEXTK:PRINTCHR$(20);:NEXTI:PRINT:PRIN
    T:GOTO310                       :rem 50
480 IFN<0 THEN PRINT:GOTO310        :rem 168
490 A(J)=N:NEXTJ                    :rem 199
500 CKSUM=AD-INT(AD/256)*256:FORI=1TO6:CK
    SUM=(CKSUM+A(I))AND255:NEXT     :rem 200
510 PRINTCHR$(18);:GOSUB570:PRINTCHR$(146
    );                              :rem 94
511 IFN=-1THENA=6:GOTO315           :rem 254
515 PRINTCHR$(20):IFN=CKSUMTHEN530
                                    :rem 122
520 PRINT:PRINT"LINE ENTERED WRONG : RE-E
    NTER":PRINT:GOSUB1000:GOTO310:rem 176
530 GOSUB2000                       :rem 218
540 FORI=1TO6:POKEAD+I-1,A(I):NEXT:POKE54
    272,0:POKE54273,0               :rem 227
550 AD=AD+6:IF AD<E THEN 310        :rem 212
560 GOTO 710                        :rem 108
570 N=0:Z=0                         :rem 88
580 PRINT"[£]";                     :rem 81
581 GETA$:IFA$=""THEN581            :rem 95
582 AV=-(A$="M")-2*(A$=",")-3*(A$=".")-4*
    (A$="J")-5*(A$="K")-6*(A$="L"):rem 41
583 AV=AV-7*(A$="U")-8*(A$="I")-9*(A$="O"
    ):IFA$="H"THENA$="0"            :rem 134
584 IFAV>0THENA$=CHR$(48+AV)        :rem 134
585 PRINTCHR$(20);:A=ASC(A$):IFA=13ORA=44
    ORA=32THEN670                   :rem 229
590 IFA>128THENN=-A:RETURN          :rem 137
600 IFA<>20 THEN 630                :rem 10
610 GOSUB690:IFI=1ANDT=44THENN=-1:PRINT"
    {OFF}{LEFT} {LEFT}";:GOTO690    :rem 62
620 GOTO570                         :rem 109
630 IFA<48ORA>57THEN580             :rem 105
640 PRINTA$;:N=N*10+A-48            :rem 106
650 IFN>255 THEN A=20:GOSUB1000:GOTO600
                                    :rem 229
660 Z=Z+1:IFZ<3THEN580              :rem 71
670 IFZ=0THENGOSUB1000:GOTO570      :rem 114
680 PRINT",";:RETURN                :rem 240
690 S%=PEEK(209)+256*PEEK(210)+PEEK(211)
                                    :rem 149
691 FORI=1TO3:T=PEEK(S%-I)          :rem 67
695 IFT<>44ANDT<>58THENPOKES%-I,32:NEXT
                                    :rem 205
700 PRINTLEFT$("{3 LEFT}",I-1);:RETURN
                                    :rem 7
710 PRINT"{CLR}{RVS}*** SAVE ***{3 DOWN}"
                                    :rem 236
715 PRINT"{2 DOWN}(PRESS {RVS}RETURN{OFF}
     ALONE TO CANCEL SAVE){DOWN}":rem 106
```

```
720 F$="":INPUT"{DOWN} FILENAME";F$:IFF$=
    ""THENPRINT:PRINT:GOTO310      :rem 71
730 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
     {RVS}D{OFF}ISK: (T/D)"        :rem 228
740 GETA$:IFA$<>"T"ANDA$<>"D"THEN740
                                   :rem 36
750 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$:
    OPEN15,8,15,"S"+F$:CLOSE15     :rem 212
760 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$
    ):POKE782,ZK/256               :rem 3
762 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
    T$):SYS65469                   :rem 109
763 POKE780,1:POKE781,DV:POKE782,1:SYS654
    66                             :rem 69
765 K=S:POKE254,K/256:POKE253,K-PEEK(254)
    *256:POKE780,253               :rem 17
766 K=E+1:POKE782,K/256:POKE781,K-PEEK(78
    2)*256:SYS65496                :rem 235
770 IF(PEEK(783)AND1)OR(191ANDST)THEN780
                                   :rem 111
775 PRINT"{DOWN}DONE.{DOWN}":GOTO310
                                   :rem 113
780 PRINT"{DOWN}ERROR ON SAVE.{2 SPACES}T
    RY AGAIN.":IFDV=1THEN720       :rem 171
781 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTE1$
    ;E2$:CLOSE15:GOTO720           :rem 103
790 PRINT"{CLR}{RVS}*** LOAD ***{2 DOWN}"
                                   :rem 212
795 PRINT"{2 DOWN}(PRESS {RVS}RETURN{OFF}
     ALONE TO CANCEL LOAD)"        :rem 82
800 F$="":INPUT"{2 DOWN} FILENAME";F$:IFF
    $=""THENPRINT:GOTO310          :rem 144
810 PRINT:PRINT"{2 DOWN}{RVS}T{OFF}APE OR
     {RVS}D{OFF}ISK: (T/D)"        :rem 227
820 GETA$:IFA$<>"T"ANDA$<>"D"THEN820
                                   :rem 34
830 DV=1-7*(A$="D"):IFDV=8THENF$="0:"+F$
                                   :rem 157
840 T$=F$:ZK=PEEK(53)+256*PEEK(54)-LEN(T$
    ):POKE782,ZK/256               :rem 2
841 POKE781,ZK-PEEK(782)*256:POKE780,LEN(
    T$):SYS65469                   :rem 107
845 POKE780,1:POKE781,DV:POKE782,1:SYS654
    66                             :rem 70
850 POKE780,0:SYS65493             :rem 11
860 IF(PEEK(783)AND1)OR(191ANDST)THEN870
                                   :rem 111
865 PRINT"{DOWN}DONE.":GOTO310     :rem 96
870 PRINT"{DOWN}ERROR ON LOAD.{2 SPACES}T
    RY AGAIN.{DOWN}":IFDV=1THEN800
                                   :rem 172
880 OPEN15,8,15:INPUT#15,E1$,E2$:PRINTE1$
    ;E2$:CLOSE15:GOTO800           :rem 102
1000 REM BUZZER                    :rem 135
1001 POKE54296,15:POKE54277,45:POKE54278,
     165                           :rem 207
1002 POKE54276,33:POKE 54273,6:POKE54272,
     5                             :rem 42
1003 FORT=1TO200:NEXT:POKE54276,32:POKE54
     273,0:POKE54272,0:RETURN      :rem 202
2000 REM BELL SOUND                :rem 78
2001 POKE54296,15:POKE54277,0:POKE54278,2
     47                            :rem 152
2002 POKE 54276,17:POKE54273,40:POKE54272
     ,0                            :rem 86
2003 FORT=1TO100:NEXT:POKE54276,16:RETURN
                                   :rem 57
3000 PRINTC$;"{RVS}NOT ZERO PAGE OR ROM":
     GOTO1000                      :rem 89
```

Machine Language For Beginners

(Article on page 116.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

VIC/64 Assembler

```
10 H=0:REM IF H = 1 THEN ASSEMBLY IS IN H
   EX                              :rem 32
50 HE$="0123456789ABCDEF":SZ=1:ZO$="000"
                                   :rem 166
100 PRINT"{3 SPACES}SIMPLE{3 SPACES}ASSEM
    BLER{2 SPACES}CONVENTIONS:"    :rem 90
110 DIMM$(56),TY(56),OP(56)        :rem 181
120 FORI=1TO56:READM$(I)           :rem 160
122 ROP$=MID$(M$(I),4,1):TY(I)=VAL(ROP$)
                                   :rem 5
124 OP$=RIGHT$(M$(I),3):OP(I)=VAL(OP$)
                                   :rem 155
126 M$(I)=LEFT$(M$(I),3)           :rem 235
140 NEXTI: PRINT                   :rem 228
150 PRINT"IMMEDIATE{5 SPACES}LDA #15
                                   :rem 46
155 PRINT"ABSOLUTE{6 SPACES}LDA 1500
                                   :rem 64
160 PRINT"ZERO PAGE{5 SPACES}LDA 15
                                   :rem 218
165 PRINT"ACCUMULATOR{3 SPACES}ASL
                                   :rem 107
170 PRINT"INDIRECT X{4 SPACES}LDA (15X)
                                   :rem 209
175 PRINT"INDIRECT Y{4 SPACES}LDA (15)Y
                                   :rem 216
177 PRINT"ZERO PAGE X{3 SPACES}LDA 15X
                                   :rem 146
179 PRINT"ZERO PAGE Y{3 SPACES}LDX 15Y
                                   :rem 173
180 PRINT"ABSOLUTE X{4 SPACES}LDA 1500X
                                   :rem 238
185 PRINT"ABSOLUTE Y{4 SPACES}LDA 1500Y
                                   :rem 245
189 PRINT:PRINT"{4 SPACES}ENTER ALL NUMBE
    RS IN ";                       :rem 127
190 IFH=1 THENPRINT"HEX":GOTO200   :rem 201
195 PRINT"DECIMAL"                 :rem 95
200 PRINT:PRINT"PLEASE INPUT STARTING ADD
    RESS FOR ML PROGRAM":INPUT SA$ :rem 0
210 IFH=1THENH$=SA$:GOSUB5000:SA=DE:GOTO2
    20                             :rem 130
215 SA=VAL(SA$)                    :rem 85
220 TA=SA:PRINT"{CLR}":REM CLEAR THE SCRE
    EN                             :rem 190
230 IFH=1THENDE=SA:SZ=3:GOSUB4000:PRINTH$
    ;:GOTO240                      :rem 175
235 PRINTSA" ";                    :rem 58
240 INPUTMN$:PRINT"{UP}"SPC(20);:REM GO U
    P ONE LINE AND OVER 20 SPACES:rem 232
241 REM ADD NEW PSEUDO-OPS HERE    :rem 65
242 IFRIGHT$(MN$,7)="FORWARD"THENFB=SA
                                   :rem 90
```

```
243 IFRIGHT$(MN$,7)="RESOLVE"THENFR=SA-FB
    :POKEFB+1,FR-2:PRINT"{2 SPACES}OK":GO
    TO230                                :rem 72
244 IFRIGHT$(MN$,4)="POKE"THENPRINT"ADDR,
    NUMBER(DEC)";:INPUTADR,NUM:POKEADR,NU
    M:GOTO230                            :rem 116
250 IFMN$="END"THENPRINT:PRINT"{6 SPACES}
    PROGRAM IS FROM"TA"TO"SA:END         :rem 13
260 L=LEN(MN$):L$=LEFT$(MN$,3)           :rem 181
270 FORI=1TO56:IFL$=M$(I)THEN300         :rem 136
280 NEXTI                                :rem 34
290 GOTO850                              :rem 113
300 REM PRIMARY OPCODE CATEGORIES        :rem 59
301 TY=TY(I):OP=OP(I)                    :rem 20
305 IFFB=SATHENTN=0:GOTO2010             :rem 244
310 IFTY=0THENGOTO1000                   :rem 102
320 IFTY=3THENTY=1:IFL=3THENOP=OP+8:GOTO1
    000                                  :rem 81
330 R$=RIGHT$(MN$,L-4):IFH=1THENGOSUB6000
                                         :rem 200
340 LR$=LEFT$(R$,1):LL=LEN(R$):IFLR$="#"T
    HEN480                               :rem 184
350 IFLR$="("THEN520                     :rem 88
360 IFTY=8THEN600                        :rem 15
370 IFTY=3THENOP=OP+8:GOTO1000           :rem 135
380 IFRIGHT$(R$,1)="X"ORRIGHT$(R$,1)="Y"T
    HEN630                               :rem 210
390 IFLEFT$(L$,1)="J"THEN820             :rem 44
400 TN=VAL(R$):IFTN>255THEN430           :rem 40
410 IFTY=1ORTY=3ORTY=4ORTY=5THENOP=OP+4
                                         :rem 133
420 GOTO2000                             :rem 145
430 H%=TN/256:L%=TN-256*H%:IFTY=2ORTY=7TH
    ENOP=OP+8:GOTO470                    :rem 92
440 IFTY=1ORTY=3ORTY=4ORTY=5THENOP=OP+12:
    GOTO470                              :rem 197
450 IFTY=6ORTY=9THEN470                  :rem 214
460 GOTO850                              :rem 112
470 GOTO3000                             :rem 151
480 TN=VAL(RIGHT$(R$,LL-1))              :rem 58
490 IFTY=1THENOP=OP+8:GOTO2000           :rem 137
500 IFTY=4ORTY=5THENGOTO2000             :rem 44
510 GOTO850                              :rem 108
520 IFRIGHT$(R$,2)=")Y"THEN540           :rem 184
530 IFRIGHT$(R$,2)="X)"THEN570           :rem 187
540 TN=VAL(MID$(R$,2,LL-3))              :rem 243
550 IFTY=1THENOP=OP+16:GOTO2000          :rem 181
560 GOTO850                              :rem 113
570 TN=VAL(MID$(R$,2,LL-3))              :rem 246
580 IFTY=1THENGOTO2000                   :rem 113
590 GOTO850                              :rem 116
600 TN=VAL(R$):TN=TN-SA-2:IFTN<-128ORTN>1
    27THENPRINT"TOO FAR ";:GOTO850
                                         :rem 154
610 IFTN<0THENTN=TN+256                  :rem 172
620 GOTO2000                             :rem 147
630 IFRIGHT$(R$,2)=")Y"THEN540           :rem 186
640 IFRIGHT$(R$,1)="X"THEN720            :rem 144
650 REM *ZERO Y                          :rem 66
660 TN=VAL(LEFT$(R$,LL-1)):IFTN>255THEN68
    0                                    :rem 249
670 IFTY=2ORTY=5THEN730                  :rem 209
675 IFTY=1THEN760                        :rem 24
680 GOSUB770:IFTY=1THENOP=OP+24:GOTO710
                                         :rem 230
690 IFTY=5THENOP=OP+28:GOTO710           :rem 151
700 GOTO850                              :rem 109
710 GOTO3000                             :rem 148
720 TN=VAL(LEFT$(R$,LL-1)):IFTN>255THENGO
    SUB770:GOTO780                       :rem 136
730 IFTY=2THENOP=OP+16:GOTO760           :rem 145
740 IFTY=1ORTY=3ORTY=5THENOP=OP+20:GOTO76
    0                                    :rem 10
750 GOTO850                              :rem 114
760 GOTO2000                             :rem 152
770 H%=TN/256:L%=TN-256*H%:RETURN:rem 187
780 IFTY=2THENOP=OP+24:GOTO810           :rem 145
790 IFTY=1ORTY=3ORTY=5THENOP=OP+28:GOTO81
    0                                    :rem 19
800 GOTO850                              :rem 110
810 GOTO3000                             :rem 149
820 TN=VAL(R$)                           :rem 35
830 GOSUB770                             :rem 185
840 GOTO710                              :rem 109
850 PRINT"{RVS} ERROR ":GOTO230          :rem 18
1000 REM 1 BYTE INSTRUCTIONS             :rem 191
1010 POKESA,OP:SA=SA+1:IFH=1THEN 1030
                                         :rem 189
1020 PRINTOP:GOTO230                     :rem 247
1030 DE = OP:GOSUB4000:PRINTH$:GOTO230
                                         :rem 226
2000 REM 2 BYTE INSTRUCTIONS             :rem 193
2005 IFTN>256THENPRINT" INCORRECT ARGUMEN
     T. (#5 IN HEX IS #05)":GOTO230
                                         :rem 94
2010 POKESA,OP:POKESA+1,TN:SA=SA+2:IFH=1T
     HEN2030                             :rem 231
2020 PRINTOP;TN:GOTO230                  :rem 213
2030 DE = OP:GOSUB4000:PRINTH$" ";:rem 90
2040 DE = TN:GOSUB4000:PRINTH$:GOTO230
                                         :rem 231
3000 REM 3 BYTE INSTRUCTIONS             :rem 195
3010 POKESA,OP:POKESA+1,L%:POKESA+2,H%:SA
     =SA+3:IFH=1THEN3030                 :rem 172
3020 PRINTOP;L%;H%:GOTO230               :rem 77
3030 DE = OP:GOSUB4000:PRINTH$" ";:rem 91
3040 DE = L%:GOSUB4000:PRINTH$" ";:rem 46
3050 DE = H%:GOSUB4000:PRINTH$:GOTO230
                                         :rem 180
4000 REM{2 SPACES}DECIMAL TO HEX (DE TO H
     $)                                  :rem 8
4010 H$="":FORM=SZTO0STEP-1:N%=DE/(16↑M):
     DE=DE-N%*16↑M:H$=H$+MID$(HE$,N%+1,1)
                                         :rem 179
4020 NEXT:SZ=1:RETURN                    :rem 116
5000 REM{2 SPACES}HEX TO DECIMAL (H$ TO D
     E)                                  :rem 9
5010 D=0:Q=3:FORM=1TO4:FORW=0TO15:IFMID$(
     H$,M,1)=MID$(HE$,W+1,1)THEN5030
                                         :rem 221
5020 NEXTW                               :rem 93
5030 D1=W*(16↑(Q)):D=D+D1:Q=Q-1:NEXTM:DE=
     INT(D):RETURN                       :rem 41
6000 REM ACCEPT HEX OPCODE INPUT AND TRAN
     SLATE IT TO DECIMAL                 :rem 57
6010 IFLEFT$(R$,1)="#"THENH$="00"+RIGHT$(
     R$,2):GOSUB5000:R$="#"+STR$(DE):RETU
     RN                                  :rem 234
6020 LS=LEN(R$):AZ$=LEFT$(R$,1):ZA$=MID$(
     R$,LS,1):IFAZ$<>"("THEN6050 :rem 126
6030 IFZA$="Y"THENH$="00"+MID$(R$,2,2):GO
     SUB5000:R$="("+STR$(DE)+")Y":RETURN
                                         :rem 30
6040 IFZA$=")"THENH$="00"+MID$(R$,2,2):GO
     SUB5000:R$="("+STR$(DE)+"X)":RETURN
                                         :rem 238
6050 IFZA$="X"ORZA$="Y"THEN6070          :rem 40
6060 H$=LEFT$(ZA$,4-LS)+R$:GOSUB5000:R$=S
     TR$(DE):RETURN                      :rem 30
6070 IFLS=5THENH$=LEFT$(R$,4):GOTO6090
                                         :rem 253
6080 H$="00"+LEFT$(R$,2)                 :rem 186
```

```
6090 GOSUB5000:R$=STR$(DE)+ZA$:RETURN
                                    :rem 252
20000 DATAADC1097,AND1033,ASL3002,BCC8144
      ,BCS8176,BEQ8240,BIT7036,BMI8048
                                    :rem 96
20010 DATABNE8208,BPL8016,BRK0000,BVC8080
      ,BVS8112,CLC0024,CLD0216,CLI0088
                                    :rem 114
20020 DATACLV0184,CMP1193,CPX4224,CPY4192
      ,DEC2198,DEX0202,DEY0136,EOR1065
                                    :rem 184
20030 DATAINC2230,INX0232,INY0200,JMP6076
      ,JSR9032,LDA1161,LDX5162,LDY5160
                                    :rem 200
20040 DATALSR3066,NOP0234,ORA1001,PHA0072
      ,PHP0008,PLA0104,PLP0040,ROL3034
                                    :rem 185
20050 DATAROR3098,RTI0064,RTS0096,SBC1225
      ,SEC0056,SED0248,SEI0120,STA1129
                                    :rem 216
20060 DATASTX2134,STY2132,TAX0170,TAY0168
      ,TSX0186,TXA0138,TXS0154,TYA0152
                                    :rem 79
```

Telecommunications Software

(Article on page 38.)

BEFORE TYPING...

Before typing in programs, please refer to "How To Type COMPUTE!'s Gazette Programs," "A Beginner's Guide To Typing In Programs," and "The Automatic Proofreader" that appear before the Program Listings.

C/G Term For VIC And 64

(NOTE: VIC users must replace the last three lines of this listing as noted in the corresponding article.)

```
4609 :011,008,010,000,158,052,240
4615 :054,050,049,000,000,000,160
4621 :032,231,255,162,000,142,067
4627 :255,043,169,000,133,251,102
4633 :169,044,133,252,172,255,026
4639 :043,169,000,145,251,032,159
4645 :251,029,174,255,043,224,245
4651 :204,208,239,166,252,224,056
4657 :046,144,233,162,000,142,008
4663 :255,043,032,110,041,169,193
4669 :006,141,147,002,173,239,001
4675 :043,201,022,208,008,169,206
4681 :032,141,018,145,076,085,058
4687 :018,169,032,141,003,221,151
4693 :169,002,162,002,160,255,067
4699 :032,186,255,169,001,162,128
4705 :147,160,002,032,189,255,114
4711 :032,192,255,032,246,040,132
4717 :032,204,255,169,163,141,049
4723 :098,039,169,043,141,099,192
4729 :039,032,086,039,169,000,230
4735 :141,131,044,032,204,255,166
4741 :032,128,041,174,131,044,171
4747 :224,000,208,013,032,204,052
4753 :255,032,228,255,201,000,092
4759 :240,228,141,131,044,173,084
4765 :131,044,201,003,208,006,238
4771 :032,076,041,076,029,019,180
4777 :174,239,043,224,022,208,055
4783 :006,173,016,145,076,185,008
4789 :018,173,001,221,041,016,139
4795 :201,000,208,234,173,239,218
4801 :043,141,131,044,032,246,062
4807 :021,032,214,021,173,131,023
4813 :044,201,002,208,008,169,069
4819 :001,141,049,043,076,229,238
4825 :018,201,019,208,003,076,230
4831 :229,018,201,022,208,218,095
4837 :032,204,255,032,228,255,211
4843 :201,000,208,246,173,239,022
4849 :043,141,131,044,032,246,110
4855 :021,032,076,041,076,029,010
4861 :019,032,246,040,032,204,058
4867 :255,174,118,044,224,000,050
4873 :240,018,169,158,141,098,065
4879 :039,169,044,141,099,039,034
4885 :032,086,039,162,000,142,226
4891 :118,044,032,193,020,162,084
4897 :000,142,198,044,142,131,178
4903 :044,032,204,255,032,128,222
4909 :041,174,131,044,224,000,147
4915 :208,010,032,228,255,141,157
4921 :131,044,201,000,240,051,212
4927 :162,001,142,198,044,173,015
4933 :131,044,201,028,176,036,173
4939 :201,013,240,032,201,020,014
4945 :240,028,201,020,144,006,208
4951 :032,000,021,076,018,022,000
4957 :201,017,176,014,201,014,204
4963 :240,010,201,005,240,006,033
4969 :032,000,021,076,018,022,018
4975 :076,148,019,032,204,255,077
4981 :162,002,032,198,255,032,030
4987 :228,255,201,000,240,159,182
4993 :141,131,044,032,238,020,223
4999 :174,189,044,224,000,208,206
5005 :228,032,204,255,076,068,236
5011 :019,173,131,044,201,147,094
5017 :208,008,169,000,141,131,042
5023 :044,076,037,020,174,198,196
5029 :044,224,000,240,123,173,201
5035 :131,044,201,134,208,024,145
5041 :174,239,043,224,022,208,063
5047 :006,032,175,041,076,193,194
5053 :019,238,032,208,169,000,087
5059 :141,131,044,076,037,020,132
5065 :201,138,208,024,174,239,161
5071 :043,224,022,208,006,032,230
5077 :200,041,076,221,019,238,240
5083 :033,208,169,000,141,131,133
5089 :044,076,037,020,201,139,230
5095 :208,013,169,001,141,117,112
5101 :044,169,000,141,131,044,254
5107 :076,037,020,201,135,208,152
5113 :014,234,234,234,234,234,153
5119 :234,169,000,141,131,044,206
5125 :076,037,020,201,136,208,171
5131 :011,234,234,234,234,234,168
5137 :234,169,000,141,131,044,224
5143 :201,140,208,010,162,001,233
5149 :142,114,044,169,000,141,127
5155 :131,044,032,224,020,173,147
5161 :131,044,201,000,208,003,116
5167 :076,136,020,173,198,044,182
5173 :201,001,208,031,032,204,218
```

```
5179 :255,162,002,032,201,255,198
5185 :173,131,044,032,210,255,142
5191 :032,238,020,174,189,044,000
5197 :224,000,208,240,174,049,204
5203 :043,224,001,240,042,173,038
5209 :131,044,201,004,208,015,180
5215 :174,198,044,224,000,208,175
5221 :028,169,000,141,131,044,102
5227 :076,205,030,032,204,255,141
5233 :173,131,044,032,210,255,190
5239 :173,131,044,201,034,208,142
5245 :004,169,000,133,212,234,109
5251 :234,234,234,234,234,174,195
5257 :117,044,224,000,240,016,010
5263 :162,000,142,117,044,032,128
5269 :204,255,169,147,032,210,142
5275 :255,076,190,020,174,011,113
5281 :044,224,000,240,011,162,074
5287 :000,142,011,044,032,000,140
5293 :021,076,126,035,174,114,207
5299 :044,224,000,240,006,032,213
5305 :000,021,076,252,023,076,121
5311 :029,019,165,209,133,243,221
5317 :024,165,210,109,240,043,220
5323 :133,244,164,211,177,209,061
5329 :073,128,145,209,177,243,160
5335 :141,191,044,173,134,002,132
5341 :145,243,096,164,211,177,233
5347 :209,073,128,145,209,173,140
5353 :191,044,145,243,096,032,216
5359 :183,255,041,002,141,189,026
5365 :044,096,032,183,255,041,128
5371 :064,141,189,044,096,032,049
5377 :204,255,169,146,032,210,249
5383 :255,032,204,255,096,173,254
5389 :150,044,201,058,144,015,113
5395 :041,015,024,105,009,010,223
5401 :010,010,010,141,151,044,135
5407 :076,043,021,041,015,010,237
5413 :010,010,010,141,151,044,147
5419 :096,169,003,032,195,255,025
5425 :032,204,255,169,000,032,229
5431 :144,255,169,128,032,144,159
5437 :255,169,003,162,008,160,050
5443 :000,032,186,255,169,007,204
5449 :162,020,160,043,032,189,167
5455 :255,169,000,162,060,160,117
5461 :045,032,213,255,032,128,022
5467 :039,174,118,044,224,000,178
5473 :240,001,096,162,000,142,226
5479 :145,044,032,204,255,174,189
5485 :145,044,189,060,045,201,025
5491 :066,240,013,238,145,044,093
5497 :174,145,044,224,000,208,148
5503 :236,076,108,021,238,145,183
5509 :044,174,145,044,189,060,021
5515 :045,201,076,240,006,238,177
5521 :145,044,076,108,021,206,233
5527 :145,044,206,145,044,206,173
5533 :145,044,174,145,044,189,130
5539 :060,045,141,000,044,238,179
5545 :145,044,174,145,044,189,142
5551 :060,045,141,001,044,096,050
5557 :173,150,044,201,058,144,183
5563 :011,041,015,024,105,009,136
5569 :141,150,044,076,204,021,061
5575 :041,015,141,150,044,173,251
5581 :150,044,013,151,044,141,236
5587 :150,044,096,032,183,255,203
5593 :032,204,255,162,002,032,136
5599 :198,255,032,207,255,201,091
5605 :000,240,249,141,131,044,010
5611 :032,238,020,174,189,044,164
5617 :224,000,208,225,096,032,002
5623 :183,255,032,204,255,162,058
5629 :002,032,201,255,173,131,023
5635 :044,032,210,255,032,238,046
5641 :020,174,189,044,224,000,148
5647 :208,229,096,173,131,044,128
5653 :201,021,208,037,174,049,199
5659 :043,224,000,208,020,174,184
5665 :198,044,224,000,240,100,071
5671 :162,001,142,011,044,169,056
5677 :004,141,131,044,076,037,222
5683 :020,174,198,044,224,001,200
5689 :240,080,076,126,035,174,020
5695 :198,044,224,001,240,070,072
5701 :201,023,208,003,076,251,063
5707 :022,201,024,208,010,174,202
5713 :049,043,224,001,208,052,146
5719 :076,097,040,201,004,208,201
5725 :016,174,049,043,224,001,088
5731 :208,006,032,204,255,076,112
5737 :205,030,076,219,030,201,098
5743 :007,208,010,174,049,043,090
5749 :224,001,208,018,076,152,028
5755 :022,201,010,208,011,032,095
5761 :246,040,169,000,141,131,088
5767 :044,076,029,019,162,000,209
5773 :142,198,044,169,000,141,067
5779 :131,044,076,114,019,032,051
5785 :214,021,173,131,044,201,169
5791 :048,208,019,174,239,043,122
5797 :224,022,208,006,032,033,178
5803 :042,076,197,022,032,015,043
5809 :042,076,197,022,174,239,159
5815 :043,224,022,208,006,032,206
5821 :042,042,076,197,022,032,088
5827 :024,042,032,214,021,174,190
5833 :239,043,224,022,208,006,175
5839 :032,215,041,076,221,022,046
5845 :173,131,044,041,015,141,246
5851 :032,208,032,214,021,174,132
5857 :239,043,224,022,208,006,199
5863 :032,227,041,076,245,022,106
5869 :173,131,044,041,015,141,014
5875 :033,208,032,204,255,076,027
5881 :029,019,032,204,255,169,189
5887 :147,032,210,255,032,057,220
5893 :040,162,000,142,145,044,026
5899 :032,228,255,240,251,201,194
5905 :020,208,014,174,145,044,110
5911 :240,242,206,145,044,032,164
5917 :210,255,076,011,023,201,037
5923 :013,240,074,201,032,240,067
5929 :008,201,048,144,221,201,096
5935 :058,176,035,032,210,255,045
5941 :174,190,044,224,000,240,157
5947 :003,076,179,023,174,145,147
5953 :044,157,017,044,238,145,198
5959 :044,174,145,044,224,026,216
5965 :208,188,032,142,042,076,253
5971 :251,022,201,065,144,178,176
5977 :201,091,144,213,201,097,012
5983 :144,170,201,123,144,205,058
5989 :201,193,144,162,201,219,197
5995 :144,197,076,011,023,032,078
6001 :210,255,174,190,044,224,186
```

```
6007 :000,240,003,076,204,023,153
6013 :174,145,044,169,027,157,073
6019 :017,044,238,145,044,162,013
6025 :000,142,143,044,174,145,017
6031 :044,169,009,157,017,044,071
6037 :238,145,044,174,145,044,171
6043 :169,000,157,017,044,032,062
6049 :068,041,032,071,040,162,063
6055 :000,142,145,044,162,001,149
6061 :142,190,044,076,011,023,147
6067 :174,145,044,157,077,044,052
6073 :238,145,044,174,145,044,207
6079 :224,032,240,003,076,011,009
6085 :023,032,058,039,076,163,076
6091 :023,174,145,044,169,027,017
6097 :157,077,044,238,145,044,146
6103 :174,145,044,169,000,157,136
6109 :077,044,170,142,190,044,120
6115 :032,072,039,169,067,141,235
6121 :098,039,169,042,141,099,053
6127 :039,032,086,039,032,089,044
6133 :035,032,089,035,032,089,045
6139 :035,032,246,040,174,114,124
6145 :044,224,000,240,013,169,179
6151 :219,141,098,039,169,043,204
6157 :141,099,039,032,086,039,193
6163 :032,193,020,169,000,141,062
6169 :131,044,032,204,255,032,211
6175 :128,041,174,131,044,224,005
6181 :000,208,013,032,204,255,237
6187 :032,228,255,201,000,240,231
6193 :228,141,131,044,173,131,129
6199 :044,201,147,240,218,201,082
6205 :003,208,030,173,114,044,121
6211 :201,000,032,000,021,240,049
6217 :020,032,246,021,032,246,158
6223 :040,032,093,041,169,000,198
6229 :141,131,044,141,114,044,188
6235 :076,254,018,201,133,208,213
6241 :008,169,001,141,157,044,105
6247 :076,204,024,201,137,208,185
6253 :008,169,001,141,115,044,075
6259 :076,204,024,201,134,208,194
6265 :019,174,239,043,224,022,074
6271 :208,006,032,175,041,076,153
6277 :204,024,238,032,208,076,147
6283 :204,024,201,138,208,019,165
6289 :174,239,043,224,022,208,031
6295 :006,032,200,041,076,204,198
6301 :024,238,033,208,076,204,172
6307 :024,201,135,208,008,169,140
6313 :001,141,188,044,076,204,055
6319 :024,201,139,208,008,169,156
6325 :001,141,117,044,076,204,252
6331 :024,201,136,208,003,076,067
6337 :204,024,201,140,208,005,207
6343 :169,001,141,012,044,032,086
6349 :224,020,173,131,044,032,061
6355 :210,255,164,214,204,250,228
6361 :043,144,007,198,214,169,224
6367 :000,032,210,255,174,115,241
6373 :044,224,000,240,018,162,149
6379 :000,142,115,044,174,114,056
6385 :044,224,000,208,006,032,243
6391 :000,021,076,069,025,174,100
6397 :188,044,224,000,240,006,187
6403 :032,000,021,076,223,031,130
6409 :174,117,044,224,000,240,040
6415 :013,162,000,142,117,044,237
6421 :169,147,032,210,255,076,142
6427 :019,024,174,012,044,224,012
6433 :000,240,017,162,000,142,082
6439 :012,044,142,114,044,032,171
6445 :000,021,032,076,041,076,035
6451 :029,019,174,157,044,224,186
6457 :000,240,006,032,000,021,100
6463 :076,223,031,076,019,024,000
6469 :032,000,021,169,000,141,176
6475 :010,044,133,251,173,242,160
6481 :043,133,252,173,243,043,200
6487 :141,132,044,172,132,044,240
6493 :177,251,201,032,208,074,012
6499 :206,132,044,174,132,044,063
6505 :224,255,208,237,198,252,199
6511 :166,252,236,241,043,208,233
6517 :228,032,246,040,169,107,171
6523 :141,098,039,169,042,141,241
6529 :099,039,032,086,039,174,086
6535 :188,044,224,000,240,003,066
6541 :076,015,029,032,204,255,240
6547 :162,002,032,201,255,169,200
6553 :003,032,210,255,032,238,155
6559 :020,174,189,044,224,000,042
6565 :208,233,032,093,041,076,080
6571 :254,018,174,243,043,232,111
6577 :142,120,044,173,242,043,173
6583 :141,121,044,032,018,040,067
6589 :032,232,040,032,089,035,137
6595 :032,089,035,032,018,040,185
6601 :173,244,043,141,123,044,201
6607 :169,000,141,132,044,141,066
6613 :133,044,141,255,043,141,202
6619 :122,044,174,239,043,224,041
6625 :022,208,011,169,000,133,000
6631 :253,169,148,133,254,076,240
6637 :247,025,169,000,133,253,040
6643 :169,216,133,254,169,204,108
6649 :141,125,044,169,046,141,147
6655 :126,044,169,000,141,127,094
6661 :044,173,244,043,141,128,010
6667 :044,174,125,044,134,251,015
6673 :174,126,044,134,252,173,152
6679 :239,043,201,022,208,006,230
6685 :173,005,144,076,038,026,235
6691 :173,024,208,041,002,201,172
6697 :000,208,005,169,048,076,035
6703 :051,026,169,050,172,255,002
6709 :043,145,251,032,251,029,036
6715 :173,239,043,201,022,208,177
6721 :006,032,249,041,076,080,037
6727 :026,173,032,208,041,015,054
6733 :141,131,044,173,131,044,229
6739 :009,048,172,255,043,145,243
6745 :251,032,251,029,173,239,040
6751 :043,201,022,208,006,032,095
6757 :002,042,076,114,026,173,022
6763 :033,208,041,015,141,131,164
6769 :044,173,131,044,009,048,050
6775 :172,255,043,145,251,032,249
6781 :251,029,174,188,044,224,011
6787 :001,240,058,162,000,142,222
6793 :132,044,174,132,044,189,084
6799 :017,044,201,000,240,014,147
6805 :172,255,043,145,251,032,023
6811 :251,029,238,132,044,076,157
6817 :139,026,162,000,142,132,250
6823 :044,174,132,044,189,077,059
6829 :044,201,000,240,014,172,076
```

```
6835 :255,043,145,251,032,251,132
6841 :029,238,132,044,076,168,104
6847 :026,173,239,043,201,022,127
6853 :208,009,032,002,042,173,151
6859 :131,044,076,213,026,173,098
6865 :033,208,041,015,141,124,003
6871 :044,141,136,044,169,000,237
6877 :141,132,044,173,127,044,114
6883 :133,251,173,128,044,133,065
6889 :252,172,245,043,177,251,093
6895 :201,032,240,042,169,001,156
6901 :141,010,044,169,000,141,238
6907 :133,044,024,173,122,044,023
6913 :109,246,043,141,122,044,194
6919 :173,123,044,105,000,141,081
6925 :123,044,173,247,043,141,016
6931 :138,044,169,255,141,134,132
6937 :044,076,158,027,169,000,243
6943 :141,133,044,172,133,044,186
6949 :177,251,201,032,208,057,195
6955 :238,133,044,173,133,044,040
6961 :205,246,043,208,236,169,132
6967 :000,141,133,044,024,173,058
6973 :122,044,109,246,043,141,254
6979 :122,044,173,123,044,105,166
6985 :000,141,123,044,173,125,167
6991 :044,133,251,173,126,044,082
6997 :133,252,172,255,043,169,085
7003 :013,145,251,032,251,029,044
7009 :076,161,028,172,248,043,057
7015 :140,133,044,172,133,044,001
7021 :177,251,201,032,208,006,216
7027 :206,133,044,076,106,027,195
7033 :238,133,044,173,133,044,118
7039 :141,134,044,169,255,141,243
7045 :138,044,024,173,122,044,166
7051 :109,246,043,141,122,044,076
7057 :173,123,044,105,000,141,219
7063 :123,044,169,000,141,133,249
7069 :044,172,132,044,177,253,211
7075 :041,015,141,147,044,238,021
7081 :132,044,173,147,044,205,146
7087 :136,044,240,035,205,124,191
7093 :044,240,030,170,189,051,137
7099 :042,142,124,044,174,125,070
7105 :044,134,251,174,126,044,198
7111 :134,252,172,255,043,145,176
7117 :251,032,251,029,165,252,161
7123 :141,126,044,172,133,044,103
7129 :204,134,044,208,028,173,240
7135 :125,044,133,251,173,126,051
7141 :044,133,252,169,013,172,244
7147 :255,043,145,251,032,251,188
7153 :029,165,252,141,126,044,230
7159 :076,161,028,173,127,044,088
7165 :133,251,173,128,044,133,091
7171 :252,172,133,044,177,251,008
7177 :141,197,044,041,127,141,188
7183 :196,044,173,197,044,024,181
7189 :010,144,035,173,129,044,044
7195 :201,000,208,060,173,125,026
7201 :044,133,251,173,126,044,036
7207 :133,252,169,018,172,255,014
7213 :043,145,251,032,251,029,028
7219 :169,001,141,129,044,076,099
7225 :091,028,172,129,044,192,201
7231 :000,240,025,160,000,140,116
7237 :129,044,173,125,044,133,205
7243 :251,173,126,044,133,252,030
7249 :169,146,172,255,043,145,243
7255 :251,032,251,029,238,133,253
7261 :044,173,133,044,205,138,062
7267 :044,208,003,076,161,028,107
7273 :173,125,044,133,251,173,236
7279 :126,044,133,252,184,024,106
7285 :173,196,044,141,194,044,141
7291 :041,063,014,194,044,044,011
7297 :194,044,016,002,009,128,010
7303 :112,002,009,064,201,001,012
7309 :208,002,169,032,172,255,211
7315 :043,145,251,032,251,029,130
7321 :165,252,141,126,044,076,189
7327 :158,027,173,122,044,205,120
7333 :120,044,176,003,076,058,130
7339 :029,173,123,044,205,121,098
7345 :044,176,003,076,058,029,051
7351 :174,188,044,224,000,208,253
7357 :003,076,152,029,032,000,225
7363 :021,172,255,043,174,125,217
7369 :044,134,251,174,126,044,206
7375 :134,252,169,146,145,251,024
7381 :032,251,029,172,255,043,227
7387 :169,026,145,251,162,000,204
7393 :142,255,043,032,204,255,132
7399 :162,204,134,251,162,046,166
7405 :134,252,172,255,043,177,246
7411 :251,141,147,044,032,204,038
7417 :255,162,003,032,201,255,133
7423 :173,147,044,032,210,255,092
7429 :032,251,029,173,147,044,169
7435 :201,026,208,224,032,204,138
7441 :255,162,003,032,201,255,157
7447 :169,000,032,210,255,032,209
7453 :210,255,032,210,255,032,255
7459 :204,255,169,003,032,195,125
7465 :255,162,000,142,188,044,064
7471 :024,162,000,160,000,032,169
7477 :240,255,076,019,024,174,073
7483 :239,043,224,022,208,044,071
7489 :173,188,044,201,000,208,111
7495 :037,173,010,044,201,000,024
7501 :240,030,173,125,044,133,054
7507 :251,173,126,044,133,252,038
7513 :172,255,043,169,022,145,127
7519 :251,032,251,029,162,000,052
7525 :142,010,044,165,252,141,087
7531 :126,044,169,000,141,132,207
7537 :044,141,133,044,024,165,152
7543 :253,109,246,043,133,253,132
7549 :165,254,105,000,133,254,012
7555 :024,173,127,044,109,246,086
7561 :043,141,127,044,173,128,025
7567 :044,105,000,141,128,044,093
7573 :076,224,026,172,255,043,177
7579 :174,125,044,134,251,174,033
7585 :126,044,134,252,169,146,008
7591 :145,251,032,251,029,172,023
7597 :255,043,169,026,145,251,038
7603 :169,023,141,131,044,032,207
7609 :246,021,032,214,021,173,124
7615 :131,044,201,017,208,246,014
7621 :162,204,134,251,162,046,132
7627 :134,252,162,000,142,255,124
7633 :043,172,255,043,177,251,126
7639 :141,131,044,032,246,021,062
7645 :032,251,029,173,131,044,113
7651 :201,026,240,017,201,009,153
7657 :208,231,032,214,021,173,088
```

```
7663 :131,044,201,017,208,246,062
7669 :076,210,029,076,029,019,172
7675 :238,255,043,174,255,043,235
7681 :224,000,208,002,230,252,149
7687 :096,174,145,044,169,082,205
7693 :157,201,042,076,077,033,087
7699 :024,162,000,160,000,032,141
7705 :240,255,032,204,255,162,149
7711 :003,032,198,255,032,207,246
7717 :255,141,131,044,201,048,089
7723 :208,019,174,239,043,224,182
7729 :022,208,006,032,033,042,136
7735 :076,084,030,032,015,042,078
7741 :076,084,030,201,050,208,198
7747 :215,174,239,043,224,022,216
7753 :208,006,032,042,042,076,223
7759 :084,030,032,024,042,032,067
7765 :204,255,162,003,032,198,171
7771 :255,032,207,255,141,131,088
7777 :044,174,239,043,224,022,075
7783 :208,006,032,215,041,076,169
7789 :119,030,173,131,044,041,135
7795 :015,141,032,208,032,204,235
7801 :255,162,003,032,198,255,002
7807 :032,207,255,141,131,044,169
7813 :174,239,043,224,022,208,019
7819 :006,032,227,041,076,154,163
7825 :030,173,131,044,041,015,067
7831 :141,033,208,032,204,255,000
7837 :162,003,032,198,255,032,071
7843 :207,255,141,147,044,201,134
7849 :026,240,012,032,204,255,170
7855 :173,147,044,032,210,255,012
7861 :076,154,030,032,204,255,164
7867 :169,003,032,195,255,162,235
7873 :000,142,157,044,169,000,193
7879 :032,210,255,076,019,024,047
7885 :032,089,035,169,017,141,176
7891 :131,044,032,246,021,076,249
7897 :239,030,032,214,021,173,158
7903 :131,044,201,017,240,010,098
7909 :201,003,208,242,032,093,240
7915 :041,076,029,019,032,214,134
7921 :021,173,131,044,141,152,135
7927 :044,032,214,021,173,131,094
7933 :044,141,153,044,032,214,113
7939 :021,173,131,044,141,154,155
7945 :044,032,214,021,173,131,112
7951 :044,141,155,044,032,214,133
7957 :021,173,131,044,141,004,023
7963 :044,201,080,208,003,076,127
7969 :048,031,201,083,240,009,133
7975 :032,204,255,032,093,041,184
7981 :076,161,031,173,152,044,170
7987 :141,150,044,032,012,021,195
7993 :173,153,044,141,150,044,250
7999 :032,181,021,173,150,044,152
8005 :141,002,044,173,154,044,115
8011 :141,150,044,032,012,021,219
8017 :173,155,044,141,150,044,020
8023 :032,181,021,173,150,044,176
8029 :141,003,044,032,044,021,122
8035 :173,118,044,201,000,240,107
8041 :011,169,003,141,131,044,092
8047 :032,246,021,032,254,018,202
8053 :173,003,044,205,001,044,075
8059 :144,082,208,008,173,002,228
8065 :044,205,000,044,144,072,126
8071 :032,204,255,169,094,032,153
8077 :210,255,169,195,032,210,188
8083 :255,169,076,141,098,039,157
8089 :169,043,141,099,039,032,164
8095 :086,039,169,003,141,131,216
8101 :044,032,246,021,174,049,219
8107 :043,224,000,208,025,162,065
8113 :000,142,145,044,174,145,059
8119 :044,189,076,043,240,012,019
8125 :173,131,044,032,246,021,068
8131 :238,145,044,076,181,031,142
8137 :032,076,041,076,029,019,218
8143 :032,204,255,169,095,141,079
8149 :098,039,169,043,141,099,034
8155 :039,032,086,039,032,018,209
8161 :040,032,204,255,169,238,139
8167 :141,098,039,169,042,141,093
8173 :099,039,032,086,039,032,052
8179 :070,035,162,000,142,145,029
8185 :044,032,204,255,032,228,020
8191 :255,201,000,208,246,032,173
8197 :204,255,169,000,141,131,137
8203 :044,032,128,041,174,131,049
8209 :044,224,000,208,013,032,026
8215 :204,255,032,228,255,201,174
8221 :000,240,228,141,131,044,045
8227 :173,131,044,201,020,208,044
8233 :016,174,145,044,224,000,132
8239 :240,211,032,210,255,206,177
8245 :145,044,076,004,032,201,043
8251 :003,208,068,032,204,255,061
8257 :169,094,032,210,255,169,226
8263 :195,032,210,255,173,131,043
8269 :044,032,246,021,032,204,144
8275 :255,032,093,041,174,011,177
8281 :044,224,001,208,008,162,224
8287 :000,142,011,044,076,029,141
8293 :019,174,157,044,224,000,207
8299 :208,010,174,188,044,224,187
8305 :000,208,003,076,029,019,192
8311 :162,000,142,157,044,142,254
8317 :188,044,076,019,024,201,165
8323 :013,208,013,174,145,044,216
8329 :224,000,208,003,076,004,140
8335 :032,076,240,032,201,032,244
8341 :176,003,076,004,032,173,101
8347 :131,044,201,032,240,054,089
8353 :201,046,240,050,201,048,179
8359 :176,003,076,004,032,201,147
8365 :058,144,039,201,065,176,088
8371 :003,076,004,032,201,091,074
8377 :144,028,201,097,176,003,066
8383 :076,004,032,201,123,176,035
8389 :003,076,004,032,201,193,194
8395 :176,003,076,004,032,201,183
8401 :219,144,003,076,004,032,175
8407 :173,131,044,032,210,255,036
8413 :174,145,044,157,201,042,216
8419 :238,145,044,174,145,044,249
8425 :224,019,240,003,076,004,031
8431 :032,174,145,044,169,044,079
8437 :157,201,042,174,145,044,240
8443 :142,142,044,238,145,044,238
8449 :174,157,044,224,000,208,040
8455 :007,174,188,044,224,000,132
8461 :240,005,169,080,076,023,094
8467 :033,173,004,044,174,145,080
8473 :044,157,201,042,238,145,084
8479 :044,174,145,044,169,044,139
8485 :157,201,042,238,145,044,096
```

```
8491 :174,145,044,142,013,044,093
8497 :174,157,044,224,001,208,089
8503 :003,076,008,030,174,011,101
8509 :044,224,000,240,003,076,136
8515 :179,035,174,145,044,169,045
8521 :087,157,201,042,238,145,175
8527 :044,169,003,162,008,160,113
8533 :003,032,186,255,238,145,176
8539 :044,238,145,044,173,145,112
8545 :044,162,199,160,042,032,224
8551 :189,255,032,192,255,032,034
8557 :128,039,174,118,044,224,068
8563 :001,208,053,032,204,255,100
8569 :169,003,032,195,255,174,181
8575 :157,044,224,000,240,003,027
8581 :076,143,033,174,188,044,023
8587 :224,000,240,014,162,000,011
8593 :142,157,044,142,188,044,094
8599 :142,118,044,076,019,024,062
8605 :169,003,141,131,044,032,165
8611 :246,021,032,093,041,076,160
8617 :254,018,174,157,044,224,016
8623 :000,240,003,076,019,030,031
8629 :174,188,044,224,000,240,027
8635 :003,076,069,025,032,068,204
8641 :041,162,000,142,145,044,215
8647 :142,113,044,169,027,141,067
8653 :131,044,032,246,021,032,199
8659 :214,021,173,131,044,201,227
8665 :058,208,012,032,204,255,218
8671 :173,131,044,032,210,255,044
8677 :076,015,034,201,005,208,000
8683 :028,032,089,035,032,204,143
8689 :255,169,003,032,195,255,126
8695 :169,017,141,131,044,032,013
8701 :246,021,032,204,255,032,019
8707 :076,041,076,029,019,201,189
8713 :003,208,009,076,029,035,113
8719 :032,214,021,173,131,044,118
8725 :032,210,255,174,145,044,113
8731 :173,131,044,157,239,044,047
8737 :238,145,044,173,131,044,040
8743 :201,013,208,228,056,173,150
8749 :145,044,233,005,141,145,246
8755 :044,141,132,044,174,145,219
8761 :044,189,239,044,141,150,096
8767 :044,032,012,021,238,145,043
8773 :044,174,145,044,189,239,136
8779 :044,141,150,044,032,181,155
8785 :021,173,150,044,141,005,103
8791 :044,238,145,044,174,145,109
8797 :044,189,239,044,141,150,132
8803 :044,032,012,021,238,145,079
8809 :044,174,145,044,189,239,172
8815 :044,141,150,044,032,181,191
8821 :021,173,150,044,141,006,140
8827 :044,162,000,142,145,044,148
8833 :142,008,044,142,009,044,006
8839 :174,145,044,024,189,239,182
8845 :044,141,131,044,109,008,106
8851 :044,141,008,044,173,009,054
8857 :044,105,000,141,009,044,240
8863 :238,145,044,174,145,044,181
8869 :236,132,044,144,221,173,091
8875 :005,044,205,008,044,208,173
8881 :068,173,006,044,205,009,170
8887 :044,208,060,162,000,142,031
8893 :145,044,174,145,044,189,162
8899 :239,044,141,150,044,032,077
8905 :012,021,238,145,044,174,067
8911 :145,044,189,239,044,141,241
8917 :150,044,032,181,021,032,161
8923 :204,255,162,003,032,201,052
8929 :255,173,150,044,032,210,065
8935 :255,238,145,044,174,145,208
8941 :044,236,132,044,144,204,017
8947 :076,194,033,032,204,255,013
8953 :032,068,041,169,094,032,173
8959 :210,255,169,210,032,210,061
8965 :255,238,113,044,174,113,174
8971 :044,224,005,176,013,162,123
8977 :000,142,145,044,169,018,023
8983 :141,131,044,076,207,033,143
8989 :169,136,141,098,039,169,013
8995 :043,141,099,039,032,086,219
9001 :039,032,093,041,032,204,226
9007 :255,169,003,032,195,255,188
9013 :169,003,141,131,044,032,061
9019 :246,021,032,204,255,032,081
9025 :076,041,076,029,019,169,219
9031 :062,032,210,255,096,174,132
9037 :143,044,224,000,208,002,186
9043 :198,252,206,143,044,096,254
9049 :160,000,162,000,142,142,183
9055 :044,232,224,000,208,251,030
9061 :200,192,000,208,246,238,161
9067 :142,044,140,149,044,172,030
9073 :142,044,192,001,240,006,226
9079 :172,149,044,076,096,035,179
9085 :096,032,204,255,169,248,105
9091 :141,098,039,169,042,141,249
9097 :099,039,032,086,039,174,094
9103 :249,043,160,000,032,018,133
9109 :040,169,238,141,098,039,106
9115 :169,042,141,099,039,032,165
9121 :086,039,032,070,035,162,073
9127 :001,142,011,044,162,000,015
9133 :142,145,044,076,250,031,093
9139 :162,000,142,011,044,174,200
9145 :145,044,169,082,157,201,215
9151 :042,238,145,044,174,145,211
9157 :044,142,016,044,032,072,035
9163 :039,162,000,142,145,044,223
9169 :174,142,044,232,232,142,151
9175 :141,044,032,204,255,174,041
9181 :145,044,189,199,042,157,229
9187 :028,043,238,145,044,174,131
9193 :145,044,236,141,044,144,219
9199 :236,169,000,032,144,255,051
9205 :169,128,032,144,255,169,118
9211 :001,162,008,160,000,032,102
9217 :186,255,174,141,044,232,009
9223 :138,162,027,160,043,032,057
9229 :189,255,169,000,162,060,080
9235 :160,045,032,213,255,173,129
9241 :118,044,201,000,240,011,127
9247 :169,003,141,131,044,032,039
9253 :246,021,076,254,018,162,046
9259 :032,142,145,044,189,060,143
9265 :045,141,000,044,238,145,150
9271 :044,174,145,044,189,060,199
9277 :045,141,001,044,238,145,163
9283 :044,174,145,044,189,060,211
9289 :045,201,034,208,243,238,018
9295 :145,044,174,145,044,189,052
9301 :060,045,201,034,208,243,108
9307 :238,145,044,174,145,044,113
9313 :189,060,045,201,032,240,096
```

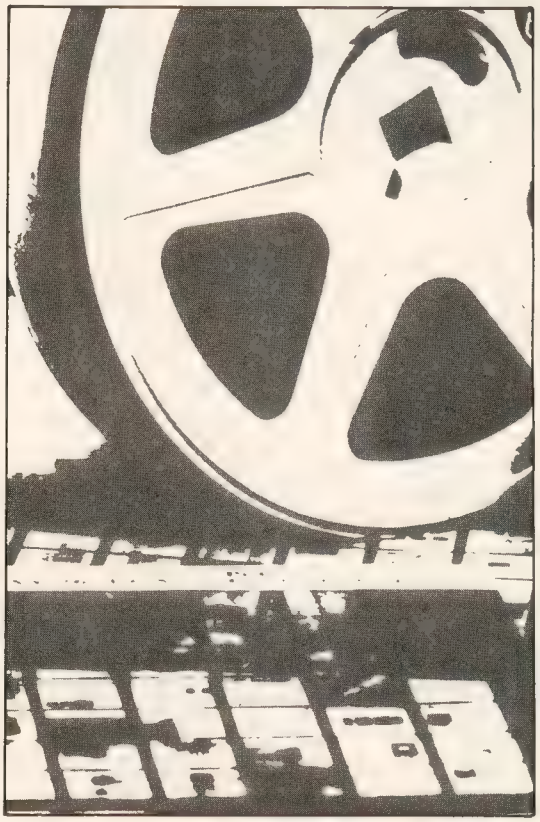
```
9319 :243,141,013,044,032,204,012
9325 :255,173,013,044,141,004,227
9331 :044,201,080,240,013,056,237
9337 :173,016,044,233,003,170,248
9343 :173,004,044,157,201,042,236
9349 :173,000,044,141,150,044,173
9355 :032,040,039,173,151,044,106
9361 :141,152,044,173,000,044,187
9367 :041,015,170,189,222,042,062
9373 :141,153,044,173,001,044,201
9379 :141,150,044,032,040,039,097
9385 :173,151,044,141,154,044,108
9391 :173,001,044,041,015,170,107
9397 :189,222,042,141,155,044,206
9403 :162,002,142,145,044,169,083
9409 :017,141,131,044,032,246,036
9415 :021,174,145,044,189,150,154
9421 :044,141,131,044,032,246,075
9427 :021,238,145,044,174,145,210
9433 :044,224,006,144,234,173,018
9439 :004,044,141,131,044,032,107
9445 :246,021,174,049,043,224,218
9451 :000,240,043,162,000,142,054
9457 :145,044,174,016,044,202,098
9463 :142,013,044,174,145,044,041
9469 :189,199,042,141,131,044,231
9475 :032,246,021,238,145,044,217
9481 :174,145,044,236,013,044,153
9487 :144,233,169,013,141,131,078
9493 :044,032,246,021,032,214,098
9499 :021,173,131,044,201,027,112
9505 :240,024,201,003,208,242,183
9511 :032,204,255,032,093,041,184
9517 :032,089,035,032,089,035,101
9523 :162,000,142,118,044,076,081
9529 :254,018,032,204,255,169,221
9535 :001,162,008,160,002,032,172
9541 :186,255,174,016,044,232,208
9547 :232,138,162,199,160,042,240
9553 :032,189,255,032,192,255,012
9559 :032,128,039,174,118,044,110
9565 :224,001,208,028,169,001,212
9571 :032,195,255,032,204,255,048
9577 :169,003,141,131,044,032,113
9583 :246,021,032,093,041,032,064
9589 :089,035,032,089,035,076,217
9595 :254,018,162,001,032,198,020
9601 :255,162,000,142,007,044,227
9607 :142,008,044,142,009,044,012
9613 :142,014,044,032,089,035,241
9619 :032,204,255,162,001,032,065
9625 :198,255,169,058,141,239,189
9631 :044,162,000,142,145,044,184
9637 :032,204,255,162,001,032,083
9643 :198,255,032,207,255,174,012
9649 :145,044,157,201,044,238,238
9655 :145,044,032,247,020,173,076
9661 :189,044,201,000,240,008,103
9667 :162,001,142,014,044,076,122
9673 :210,037,174,145,044,224,011
9679 :036,208,211,169,001,141,205
9685 :143,044,160,000,140,015,203
9691 :044,172,015,044,185,201,112
9697 :044,141,150,044,238,015,089
9703 :044,174,145,044,236,015,121
9709 :044,144,048,032,040,039,072
9715 :173,151,044,174,143,044,204
9721 :157,239,044,141,007,044,113
9727 :238,143,044,032,021,039,004
9733 :173,150,044,041,015,170,086
9739 :189,222,042,174,143,044,057
9745 :157,239,044,141,007,044,137
9751 :238,143,044,032,021,039,028
9757 :076,220,037,173,008,044,075
9763 :141,150,044,032,040,039,225
9769 :173,151,044,174,143,044,002
9775 :157,239,044,238,143,044,144
9781 :173,150,044,041,015,170,134
9787 :189,222,042,174,143,044,105
9793 :157,239,044,238,143,044,162
9799 :173,009,044,141,150,044,120
9805 :032,040,039,173,151,044,044
9811 :174,143,044,157,239,044,116
9817 :238,143,044,173,150,044,113
9823 :041,015,170,189,222,042,006
9829 :174,143,044,157,239,044,134
9835 :238,143,044,169,013,174,120
9841 :143,044,157,239,044,162,134
9847 :000,142,144,044,174,144,255
9853 :044,189,239,044,141,131,145
9859 :044,238,144,044,032,204,069
9865 :255,173,131,044,032,210,214
9871 :255,173,131,044,032,246,000
9877 :021,173,131,044,201,013,220
9883 :208,222,032,214,021,173,001
9889 :131,044,201,027,208,010,014
9895 :174,014,044,224,001,240,096
9901 :045,076,130,037,201,003,153
9907 :208,083,162,000,142,011,017
9913 :044,032,204,255,169,136,001
9919 :141,098,039,169,043,141,054
9925 :099,039,032,086,039,032,012
9931 :093,041,032,204,255,169,229
9937 :001,032,195,255,032,076,032
9943 :041,076,029,019,169,005,042
9949 :141,131,044,032,246,021,068
9955 :162,000,142,011,044,032,106
9961 :204,255,169,001,032,195,065
9967 :255,032,214,021,173,131,041
9973 :044,201,017,208,246,032,225
9979 :204,255,032,076,041,162,253
9985 :000,142,011,044,076,029,047
9991 :019,201,018,208,006,032,235
9997 :089,035,076,118,038,076,189
10003 :157,038,024,173,007,044,206
10009 :109,008,044,141,008,044,123
10015 :173,009,044,105,000,141,247
10021 :009,044,096,173,150,044,041
10027 :041,240,024,074,074,074,058
10033 :074,170,189,222,042,141,119
10039 :151,044,096,169,142,141,030
10045 :098,039,169,042,141,099,137
10051 :039,032,086,039,096,169,016
10057 :129,141,098,039,169,042,179
10063 :141,099,039,032,086,039,003
10069 :096,162,000,142,146,044,163
10075 :032,204,255,174,146,044,178
10081 :189,129,042,201,000,240,130
10087 :009,032,210,255,238,146,225
10093 :044,076,094,039,096,169,115
10099 :123,141,098,039,169,042,215
10105 :141,099,039,032,086,039,045
10111 :096,162,000,142,118,044,177
10117 :142,146,044,032,204,255,188
10123 :162,015,032,198,255,032,065
10129 :228,255,172,146,044,153,119
10135 :158,044,238,146,044,201,214
10141 :013,208,240,169,000,172,191
```

```
10147 :146,044,153,158,044,173,113
10153 :158,044,201,050,144,084,082
10159 :201,052,144,004,201,054,063
10165 :144,076,162,001,142,118,056
10171 :044,174,157,044,224,000,062
10177 :240,003,076,208,039,174,165
10183 :188,044,224,000,208,003,098
10189 :076,003,040,162,000,142,116
10195 :146,044,142,119,044,032,226
10201 :204,255,032,018,040,174,172
10207 :146,044,189,158,044,201,237
10213 :044,240,009,032,210,255,251
10219 :238,146,044,076,222,039,232
10225 :174,119,044,224,000,208,242
10231 :011,032,210,255,162,001,150
10237 :142,119,044,076,235,039,140
10243 :032,204,255,024,174,249,173
10249 :043,202,202,160,000,032,136
10255 :240,255,096,024,174,249,029
10261 :043,160,000,032,240,255,239
10267 :162,000,142,148,044,169,180
10273 :032,032,210,255,238,148,180
10279 :044,174,148,044,224,021,182
10285 :144,241,024,174,249,043,152
10291 :160,000,032,240,255,096,066
10297 :169,186,141,098,039,169,091
10303 :042,141,099,039,032,086,246
10309 :039,096,169,190,141,098,034
10315 :039,169,042,141,099,039,092
10321 :032,086,039,096,162,000,240
10327 :138,157,150,044,232,224,008
10333 :007,208,248,096,032,204,120
10339 :255,169,147,032,210,255,143
10345 :032,057,040,032,114,039,163
10351 :162,001,142,145,044,162,255
10357 :000,142,144,044,032,228,195
10363 :255,201,000,240,249,201,245
10369 :049,208,245,141,017,044,065
10375 :032,210,255,032,228,255,123
10381 :201,000,240,249,201,020,028
10387 :208,016,174,145,044,224,190
10393 :001,240,238,032,210,255,105
10399 :206,145,044,076,138,040,040
10405 :201,013,208,006,032,210,067
10411 :255,076,196,040,201,048,219
10417 :144,215,201,058,176,211,158
10423 :174,145,044,224,005,176,183
10429 :006,032,219,040,076,138,188
10435 :040,169,027,032,222,040,213
10441 :169,009,032,222,040,169,074
10447 :000,032,222,040,169,013,171
10453 :032,210,255,076,163,023,204
10459 :032,210,255,174,145,044,055
10465 :157,017,044,238,145,044,102
10471 :096,169,164,141,098,039,170
10477 :169,042,141,099,039,032,247
10483 :086,039,096,032,204,255,187
10489 :169,144,032,210,255,169,204
10495 :006,141,131,044,174,239,222
10501 :043,224,022,208,006,032,028
10507 :215,041,076,022,041,173,067
10513 :131,044,141,032,208,169,230
10519 :001,141,131,044,174,239,241
10525 :043,224,022,208,006,032,052
10531 :227,041,076,046,041,173,127
10537 :131,044,141,033,208,174,004
10543 :239,043,224,022,208,006,021
10549 :032,042,042,076,062,041,092
10555 :032,024,042,169,147,032,249
10561 :210,255,096,072,169,013,112
10567 :032,210,255,104,096,032,032
10573 :246,040,169,122,141,098,125
10579 :039,169,043,141,099,039,101
10585 :032,086,039,096,032,246,108
10591 :040,169,050,141,098,039,120
10597 :169,043,141,099,039,032,112
10603 :086,039,096,169,015,162,162
10609 :008,160,015,032,186,255,001
10615 :169,000,032,189,255,032,028
10621 :192,255,096,174,239,043,100
10627 :224,022,208,003,032,139,247
10633 :041,096,174,141,002,224,047
10639 :004,208,023,166,197,224,197
10645 :034,240,012,224,051,208,150
10651 :013,169,021,141,131,044,162
10657 :076,169,041,169,003,141,248
10663 :131,044,162,000,202,208,146
10669 :253,096,024,173,195,044,190
10675 :041,007,105,001,141,195,157
10681 :044,173,015,144,041,248,082
10687 :009,008,013,195,044,141,089
10693 :015,144,096,024,173,015,152
10699 :144,105,016,141,015,144,000
10705 :009,008,141,015,144,096,110
10711 :173,015,144,041,248,013,081
10717 :131,044,141,015,144,096,024
10723 :173,131,044,010,010,010,093
10729 :010,141,131,044,173,015,235
10735 :144,041,015,013,131,044,115
10741 :141,015,144,096,173,015,061
10747 :144,041,007,141,131,044,247
10753 :096,173,015,144,041,240,198
10759 :074,074,074,074,141,131,063
10765 :044,096,173,024,208,041,087
10771 :253,141,024,208,096,173,146
10777 :024,208,009,002,141,024,177
10783 :208,096,173,005,144,041,186
10789 :253,141,005,144,096,173,081
10795 :005,144,009,002,141,005,093
10801 :144,096,144,005,028,159,113
10807 :156,030,031,158,129,149,196
10813 :150,151,152,153,154,155,208
10819 :013,087,072,069,078,032,162
10825 :083,067,082,069,069,078,009
10831 :032,067,076,069,065,082,214
10837 :083,032,013,069,078,084,188
10843 :069,082,032,089,079,085,015
10849 :082,032,077,069,083,083,011
10855 :065,071,069,000,042,083,177
10861 :067,082,069,069,078,032,250
10867 :069,077,080,084,089,042,044
10873 :013,000,032,073,068,032,083
10879 :035,000,013,084,072,065,140
10885 :078,075,032,089,079,085,059
10891 :046,013,000,069,078,084,173
10897 :082,089,032,073,083,032,024
10903 :073,078,086,065,076,073,090
10909 :068,046,013,000,005,014,047
10915 :018,079,078,069,032,077,004
10921 :079,077,069,078,084,044,088
10927 :032,080,076,069,065,083,068
10933 :069,046,046,046,000,084,216
10939 :079,032,000,083,085,066,020
10945 :074,069,067,084,032,000,007
10951 :048,058,000,000,000,000,049
10957 :000,000,000,000,000,000,205
10963 :000,000,000,000,000,000,211
10969 :000,000,000,000,000,048,009
```

```
10975 :049,050,051,052,053,054,020
10981 :055,056,057,065,066,067,083
10987 :068,069,070,070,073,076,149
10993 :069,078,065,077,069,032,119
10999 :000,213,208,204,207,193,248
11005 :196,032,013,032,195,212,165
11011 :210,204,045,195,032,084,005
11017 :079,032,067,065,078,067,141
11023 :069,076,032,013,000,036,241
11029 :048,058,064,033,037,033,038
11035 :036,000,000,000,000,000,063
11041 :000,000,000,000,000,000,033
11047 :000,000,000,000,000,000,039
11053 :000,000,000,000,000,013,058
11059 :042,079,080,069,082,065,212
11065 :084,073,079,078,042,013,170
11071 :042,067,065,078,067,069,195
11077 :076,076,069,068,042,013,157
11083 :000,013,042,070,073,076,093
11089 :069,032,087,079,078,039,209
11095 :084,032,070,073,084,042,216
11101 :013,000,196,207,215,206,162
11107 :204,207,193,196,013,195,083
11113 :212,210,204,045,195,032,235
11119 :084,079,032,067,065,078,004
11125 :067,069,076,013,000,013,099
11131 :207,203,032,067,079,078,021
11137 :084,073,078,085,069,013,019
11143 :000,013,042,084,082,065,165
11149 :078,083,077,073,083,083,106
11155 :073,079,078,042,013,042,218
11161 :071,065,082,066,076,069,070
11167 :068,042,013,000,208,082,060
11173 :069,083,083,032,065,078,063
11179 :089,032,075,069,089,013,026
11185 :084,079,032,083,084,065,092
11191 :082,084,044,032,079,082,074
11197 :013,013,195,212,210,204,012
11203 :045,195,032,084,079,013,131
11209 :066,089,080,065,083,083,155
11215 :032,072,065,078,068,083,093
11221 :072,065,075,069,013,000,251
11227 :042,077,069,083,083,065,126
11233 :071,069,032,077,079,068,109
11239 :069,042,013,000,234,234,055
11245 :234,234,019,212,003,007,178
11251 :191,004,039,040,041,038,084
11257 :024,023,234,234,234,234,208
```


COMPUTE!'s
GAZETTE
TOLL FREE
Subscription
Order Line
800-334-0868
In NC
919-275-9809

This Publication is available in Microform.



University Microfilms International

Please send additional information

for _____
(name of publication)

Name _____

Institution _____

Street _____

City _____

State _____ Zip _____

300 North Zeeb Road
Dept. P.R.
Ann Arbor, Mi. 48106

TUSSEY MT. SOFTWARE
and Peripherals

Don't pay for expensive ads. The lowest prices are here. "Find a lower price and we'll beat it!"

Toll Free Order Line: 800-468-9044
Information and PA orders: 814-234-2236
Phone lines open 10-8 Mon-Fri, 12-5 Sat

—Order with confidence **We honor manufacturer's warranties**
—UPS second day air available, $3.00 extra on software
—We ship COD on everything except printers and monitors
—Next day shipping on instock items
—We accept Mastercard and Visa
—Free catalog available

MONTHLY SPECIALS
Prices expire 11/30/84
Specials change every month

Gemini 10X	$259.00
Gemini 10X and Cardco ?/G	$323.00
Superbase 64	$ 64.99
1541 Express	$ 73.99
WP64 and Spellpro 64 by Proline	$ 79.99
Paperclip w/Spellpack and the Consultant	$139.00

PRINTERS

Gemini 10X	$259 00
Gemini 15X	$377 00
Delta 10, 160 cps, 8k buffer	$430 00
Delta 15	$580 00
Powertype, 18 cps, letter quality	$349 00
Radix 10, Radix 15 printers from Star Micronics	Call

All above printers come with a 180-day warranty, which we honour with immediate replacement of failed unit

Cardco LQ1 letter quality printer	$459 00
Cardco LQ2	$299 00
Cardco LQ3	Call
Grappler CD printer interface	Call
Xetec printer interface	Call

WORD PROCESSORS

WP64 by Proline(d)	$ 45 00
Wordpro 3+/64 w/Spellright(d)	$ 59 00
Paperclip(d)	$ 59 00
Paperclip w/spellpack(d)	$ 83 00
Cardco Write Now/64 (cart)	$ 37 00
Mirage Professional W P (d)	$ 59 00
Mirage Personal W P (d)	$ 29 00
Omni Writer/Speller(d)	$ 45 00
Word Writer(d) by Timeworks	$ 37 00

SPREADSHEETS

Calc Result Adv (d, cart)	$ 67 00
Calc Result Easy (cart)	$ 34 00
Hesware Multiplan(d)	$ 65 00
P S. (Progr Spreadsheet)(d)	$ 55 00
Practicalc 64(d)	$ 36 00
Practicalc 64(t)	$ 34 00

MONITORS

BMC 12" Green	$ 79 00
Zenith 12" Amber	$ 97 00
Zenith 12" Green	$ 92 00

HARDWARE

MSD SD1, single disk drive	$334 00
MSD SD2, double disk drive	$559 00
BI 80, batteries included 80 column card with Basic 4 0 built in	$159 00

CARDCO

Printer int w/graphics	$ 67 00
Printer interface/B	$ 44 00
Light pen	$ 29 00
Numeric keypad	$ 35 00
5 slot exp interface CB/5	$ 58 00
Mail Now/64	$ 32 00
Spell Now	Call
File Now	Call
Graph Now	Call

UTILITIES

The Last One(d), a Basic program generator	$ 64 00
PAL 64 assembler by Proline(d)	$ 43 00
Power 64 Basic by Proline(d)	$ 43 00
Tool Box 64, both PAL 64 and Power 64(d)	$ 75 00
Supercopy 64 by Blue Sky(d)	$ 29 00
SuperBasic 64 by Blue Sky(d)	$ 29 00
Add-on-Basic by Blue Sky(d)	$ 29 00
Canada A/M backup program	$ 39 95

DATABASES

The Consultant (formerly Delphi's Oracle)(d)	$ 69 00
Mirage Database Manager(d)	$ 62 00
Superbase 64(d)	$ 64 99
Data Manager II(d) by Timeworks	$ 37 00
Practifile by MS(d)	$ 37 00

MODEMS

Commodore 1600	$ 56 00
Commodore 1650 autoanswer, autodial	$ 84 00
Hesmodem I	$ 49 00
Hesmodem II	$ 85 00
Compuserve starter kit	$ 26 95
Westridge modem	$ 76 95
Mighty Mo, new modem from USI	Call
VIP terminal package by Softlaw	$ 39 95

MISCELLANEOUS

Koalpad w/painter(d)	$ 65 00
Spellpro 64(d) by Proline	$ 43 00
Mailpro 64	$ 43 00
Complete Personal Accountant(d)	$ 54 00
Vertatim Datalife ss/dd disks (10)	$ 26 00
1541 Express by RTC	$ 73 99
Musicalc 1	$ 37 95
Musicalc 2	$ 27 95
Musicalc 3	$ 27 95
SAM, Software Automatic Mouth	$ 47 95
Mirage Advanced Report Generator	$ 39 95
The Home Accountant	$ 46 95
Timeworks Inventory, A/P, A/R, Cash Flow Management, General Ledger, Payroll Management	$ 40 95 each
64 Doctor	$ 24 95
FCM, First Class Mail	$ 36 95

Tussey Mt. Software
Box 1006
State College, PA 16804

To Order By Mail — Send personal check, money order, or certified check For fastest service send money order or certified check Allow 2 weeks for personal checks to clear

Shipping & Terms — Add $2 50 per order for shipping software Add $6 00 per order for COD Add $10 00 to ship printers, $8 00 to ship monitors COD orders not accepted on printers and monitors Foreign orders require additional amounts for shipping We pay shipping on backorders Orders shipped UPS unless noted other wise All prices reflect cash discount Visa, Mastercard add 3% Manufacturer's warranty honored with our invoice and original packaging PA residents add 6% sales tax Prices subject to change

---

NEW

COMPUTER ROAD ATLAS

TAKE TRIPS WITH COMPUTER LISTINGS SHOWING THE BEST ROUTE

ROADSEARCH MAP

ROADSEARCH IS A COMPUTERIZED ROAD ATLAS that helps you plan trips. Enter the departing city and the destination city. **ROADSEARCH** computes the shortest route or other routes more suitable to your needs. Printout includes detailed driving directions, mileage, time, fuel and more.

ROADSEARCH contains a roadmap of 406 cities/road junctions and 70,000 road miles. **ROADSEARCH-PLUS** (extra cost) also contains a **ROADMAP DEVELOPMENT SYSTEM** which lets you customize your roadmap. Add local roads, favorite shortcuts, new destinations, etc. **ROADSEARCH-PLUS** lets you add up to 50 towns/road junctions anywhere in North America.

EASY TO USE. Back-up copies allowed. Specify Apple II/IIe or Commodore-64. All Columbia Software carries a **15 DAY MONEYBACK GUARANTEE.**

STOP USING THE "OLD FASHIONED" METHOD of tracing routes on a map. It is tedious, time consuming, and inaccurate. Use your computer to plan your next route. The printed output is an excellent companion on any trip.

ORDER ROADSEARCH OR ROADSEARCH-PLUS from your dealer or directly from Columbia Software. **ROADSEARCH-PLUS** is $74.95 and **ROADSEARCH** is only $34.95. Add $1.50 for shipping and handling. MD residents add 5% state tax.

MAIL COUPON OR CALL TODAY

Columbia Software (301) 997-3100
Box 2235W, Columbia, MD 21045

Please send me ( ) **ROADSEARCH-PLUS** for $74.95 ( ) **ROADSEARCH** for $34.95 for ( ) Apple II/IIe ( ) C-64 disk

Add $1.50 shipping. If I am not satisfied, I may return it for a full refund.

( ) check ( ) Master Charge ( ) VISA

Card Number Expiration Date

NAME

ADDRESS

CITY STATE ZIP

COMMODORE USERS

WORD PROCESSING PACKAGE by CARDCO, INC.

	Regular	Special
LQ/3 Letter Quality Commodore ready printer	$449.95	**$389.95**
TF/3 Paper tractor feeder	149.95	**110.35**
C/02 "Write Now" Word Processor	49.95	**38.50**
D/04 "Spell Now" Speller Checker	39.95	**34.50**
ORDER ALL FOUR and SAVE $116.50		**573.30**

OTHER EXCELLENT CARDCO PRODUCTS

C/?+G Printer Interface with Graphics	**79.95**
C/?PS Printer Interface for parallel and serial printers	**79.95**
C/?AT Printer Interface for Atari	**74.95**
LQ/1 Letter Quality 15 CPS Commodore ready printer	**569.95**

*LQ/1 and LQ/3 compatible with most computers with a parallel printer port including: IBM, Radio Shack, Texas Instruments, Epson, Compaq, Columbia, Apple

SOFTWARE DESIGN, INC.

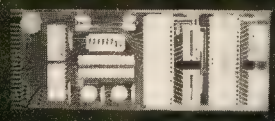
64A 64-Accounting - home and small business bookkeeping	**69.95**

*Write for catalog and prices on Riteman, Taxan, BMC, Quadram, Micro Ed, Spinnaker. All goods are new and include factory warranty.

*We accept MasterCharge, VISA, Money Order, COD (Cashiers Check), personal check must clear before shipping

Include $5.00 shipping & handling on all orders, Kansas customers add 3% sales tax

TY-COMPUTING
P.O. Box 9286, Wichita, KS 67277
316-721-5227



UNLEASH THE POWER OF YOUR COMMODORE 64 WITH THE ULTIMATE INTERFACE

- Control & monitor your home—appliances, lights & security system
- Intelligently control almost any device
- Connect to Analog-to-Digital Converters
- Control Robots
- Perform automated testing
- Acquire data for laboratory & other instrumentation applications
- Many other uses.

Don't make the mistake of buying a limited capability interface. Investigate our universally applicable Dual 6522 Versatile Interface Adapter (VIA) Board, which plugs into the expansion connector and provides:

Four 8-bit fully bidirectional I/O ports & eight handshake lines • Four 16-bit timer/counters • Full IRQ interrupt capability • Four convenient 16-pin DIP socket interface connections • Expandability up to four boards & sixteen ports.

ORDER NOW! Price $169, postpaid USA. Extensive documentation included. Each additional board $149. VISA/MasterCard welcomed.

SCHNEDLER SYSTEMS
1501 N. Ivanhoe, Dept. R10, Arlington, VA 22205
Information/Telephone Orders (703) 237-4796

WHAT'S REALLY INSIDE THE COMMODORE 64

Complete reconstructed Assembly Language source code for the C-64's BASIC and KERNAL ROMs, all 16K!

Extensively commented and cross-referenced. Far more than a mere "memory map" of useful locations, this book really does tell all. An incredible time-saver in effective C-64 programming and understanding.

C-64 Source . . . . $29.95, postpaid USA, VISA/MC

SCHNEDLER SYSTEMS
1501 N. Ivanhoe, Dept. R10, Arlington, VA 22205
Information/Telephone Orders (703) 237-4796

• •TELEMESSAGE•• BULLETIN BOARD SYSTEM FOR YOUR COMMODORE 64

Now you can operate your own Private Message System. Our package is more than just a Bulletin Board program. We designed a message system with flexibility, ease of operation and security features found on the large information services. TELEMESSAGE is a versatile system that can also be used for many business applications. Advertising and on-line order processing are excellent methods for promoting software sales! The system package includes 5 support programs in addition to the real time processor. With these tools and the comprehensive operations manual, you will have your system operating right away!

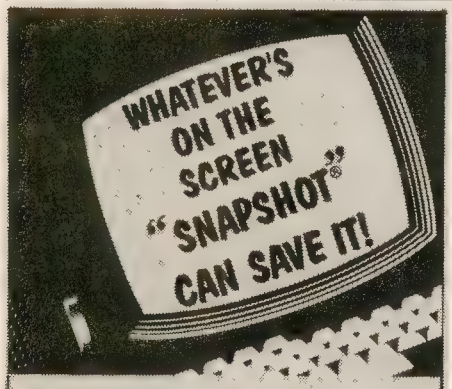
FEATURES:
* Completely automatic operation
* Security to prevent abuse or tampering
* Supports 100 registered users with passwords
* Storage capacity for 100 private messages
* Includes 5 support programs (38 functions)
* Comprehensive operations manual

REQUIRES: two 1541 drives, one auto answer modem

We are introducing the TELEMESSAGE system for only $79.50 including shipping. Please send your order with a check or money order to:

TAILORED SOLUTIONS
P.O. Box 183
Washington, D.C. 20044

Give Yourself A Gift This Year: A Subscription To COMPUTE!'s Gazette.



NOW anything that can be drawn on your screen by any program, or right from the keyboard, can now be transferred to your printer by a simple key press using SNAPSHOT.® SNAPSHOT® is a program which will "Take a picture" of whatever is printed including standard or printed characters . . . multi-color mode, Hi-Res graphics, Sprites and more. REMEMBER SNAPSHOT'S® only function is TO DUMP the screen precisely as it appears, into the printer.

The SNAPSHOT® Program is compatible with the Epson® and Gemini Star® printer. To order, send $19.95 check or money order to the address below. Free information pamphlet available upon request.

COMPUTER REVELATIONS, INC.
76 E. RIDGEWOOD AVENUE
RIDGEWOOD, NJ 07450

Thieves lurk everywhere

Precious seconds tick away as you maneuver through an intricate maze to the vault. Grab the money and hurry back to the armored truck . . . but don't get frantic. One mistake means an ambulance escort to defeat.

BRINX JINX™

Not recommended for sissys!

Brinx Jinx has up to 36 mazes and 7 vault locations to challenge your skills, along with 4 levels of difficulty to test your expertise.

Brinx Jinx features high resolution multicolor graphics, sprites, sound effects, and is 100% machine language.

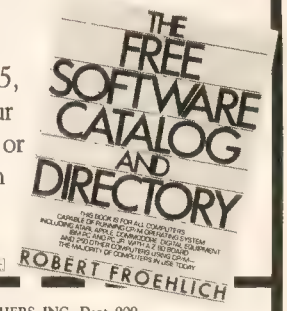
Brinx Jinx is available for the C-64 on disk only and a joystick is required.

Send $29.95 (California residents add $1.95 sales tax) in check or money order to: Chromazone Software, P.O. Box 7325, San Jose, CA 95150-7325

Allow 4–6 weeks for delivery.

THE *FREE* SOFTWARE CATALOG AND DIRECTORY

Shows you how to obtain **absolutely free** software for all CP/M computers (Atari, Apple, Commodore, Digital Equipment, IBM PC and others) with a Z-80 card or operating system software. **This is the first directory of its kind ever!** 480 pages. Paper $9.95, now at your bookstore, or use coupon to order.



CROWN PUBLISHERS, INC., Dept. 909
34 Engelhard Ave., Avenel, NJ 07001

Please send THE FREE SOFTWARE CATALOG AND DIRECTORY by Robert A. Froehlich. I enclose my check or money order for $9.95, plus $1.40 postage and handling charge. If I wish, I may return the book postpaid within 10 days for full refund.

Name_____

Address_____

City_____ State_____ Zip_____

N.Y. and N.J. residents, add sales tax.

Meet PROMAL™. The First Fast Structured Language That Lets You Program The Way You Always Wanted To. And For Only $49.95.

A New Age Dawns for Microcomputer Programming

PROMAL™ is innovative.
PROMAL (PROgrammer's Micro Application Language) was designed to achieve maximum performance from small computers...performance previously impossible except with machine language. And it was developed, specifically, to meet the need for a development system for limited memory environments.

PROMAL is complete.
It's a fast, structured programming language. It's also a true development system, complete with its own command-oriented operating system executive; fast one-pass compiler; and full-screen cursor-driven editor. In short, PROMAL is the complete set of tools that microcomputer programmers have been waiting for.

PROMAL is fast.

Commodore 64 Benchmark (Sieve of Eratosthenes)	PROMAL	BASIC	COMAL	FORTH	PASCAL	
Execution Time (secs.)	30	630	490	51	55	
Object Code Size (bytes)	128	255	329	181	415	
Program Load Time (secs.)	3.2	3.8	6.3	11.2	23.5	
Compile Time (secs.)	8.5	—	—	3.9	108	

As the benchmark results in the table show, PROMAL is much faster than any language tested. From 70% to 2000% faster! And it generates the most compact object code. The PROMAL compiler is so fast that it can compile a 100-line source program in 10 seconds or less. And, not only is it fast in compile and run time, it also speeds programming development time.

PROMAL is easy.
It's easier to learn than Pascal or C or FORTH. It makes use of powerful structured statements, like IF-ELSE, WHILE, REPEAT, FOR, and CHOOSE. Indentation of statements is part of the language's syntax, so all programs are neatly and logically written. There are no line numbers to complicate your programming. And comments don't take up memory space, so you can document programs completely. And with the full-screen editor, you can speed through program development with saves to memory and compilation from memory workspace.

PROMAL is elegant.
PROMAL overcomes the performance limitations inherent in all small systems. It gives you access to the power of the machine. But it doesn't require the complexity of machine language programming. With PROMAL, you can have performance the easy way... since it was developed from the very beginning to work on small systems...elegantly.

PROMAL may be the answer to your programming needs.
Finally, there's an answer to the need for a complete environment for simple and rapid program development. Finally, a new age has begun for microcomputer programmers. Finally, there's PROMAL.

PROMAL is available for the Commodore 64 now.

PROMAL is scheduled for release on the Apple IIe in December, 1984 and on the IBM PC in 1st Quarter, 1985.

PROMAL FEATURES

COMPILED LANGUAGE
- Structured procedural language w/indentation
- Fast, 1-pass compiler
- Simplified syntax requirements
- No line numbering required
- Long variable names
- Global, Local, & Arg variables
- Byte, Word, Integer types
- Dec or Hex number types
- Functions w/passed arguments
- Procedures w/passed arguments
- Built in I/O library
- Arrays, strings, pointers
- Control Statements: IF-ELSE, IF, WHILE, FOR, CHOOSE, BREAK, REPEAT, INCLUDE, NEXT, ESCAPE, REFUGE
- Compiler I/O from/to disk or memory

EXECUTIVE
- Command oriented, w/line edit
- Memory resident
- Allows multiple user programs in memory at once
- Function key definitions
- Program abort and pause
- 22 Resident system commands, 8 user-defined resident commands, no limit on disk commands
- Prior command recall
- I/O Re-direction to disk or printer (UNIX-like)

EDITOR
- Full-screen, cursor driven
- Function key controlled
- Line insert, delete, search
- String search and replace
- Block copy, move, delete & write to/read from file
- Auto indent, undent support

LIBRARY
- 43 Machine-language commands
- Memory resident
- Call by name with arguments
- I/O, Edit, String, Cursor control and much more

PROMAL runs on Commodore 64s with disk drive.

HOW TO ORDER

☐ Please send me my copy of PROMAL for the Commodore 64 at $49.95 plus $5.00 for shipping and handling at a total cost of $54.95. Satisfaction guaranteed.

☐ Please send me a PROMAL demo diskette for the Commodore 64 at $10 for the diskette plus $2.50 for postage and handling for a total cost of $12.50. (Non-refundable.)

☐ My check is enclosed. ☐ Please charge my purchase to my... ☐ Visa ☐ MasterCard

Card Number _____ Expiration Date _____

Signature _____

Name _____

Address _____

City, State, Zip _____ North Carolina residents add 4½% sales tax.

For quicker response on credit card orders, call...

Toll Free 1-800-762-7874 (In North Carolina 919-787-7703)

Our Guarantee

Try your copy of PROMAL for 15 days. If you are not completely satisfied, return it to us undamaged and we'll refund your money. No questions asked. Dealer inquiries invited.

SMA

SYSTEMS MANAGEMENT ASSOCIATES
3700 Computer Drive, Dept. GP-1
Raleigh, North Carolina 27609

RABBIT

For the 64 or VIC

$39.95

Alternative to the 1541 Disk Drive!

Load or save 8K in 30 seconds! It's less expensive than disk and can even be used as a backup to the flaky 1541!

Yes, the RABBIT is that and much more. Uses the Commodore cassette deck but loads and saves much, much faster than regular Commodore load/save. Think about it — loads or saves an 8K program in almost 30 seconds, 16K in 1 minute, etc. That's nearly as fast as the 1541 disk. RABBIT is on cartridge so it's always there. Also has other useful commands. Specify for use on the 64, or on the VIC 20 —

"It was the best purchase for my computer that I have ever made!"

"Congratulations on your 64 Rabbit. It's a super piece of work."

MAE

NOW THE BEST FOR LESS!

Please for your own protection consider the MAE first before you buy that other assembler. We've had numerous customers who wasted their money on some cheaper off brand assembler tell us how much better the MAE is.

The most powerful Macro Assembler/Editor available for the Commodore 64 and other CBM/PET computers, and also for the ATARI 800/XL and Apple II/IIE.

MAE includes an Assembler, Editor, Word Processor, Relocating Loader, and more all for just $59.95.

We could go on and describe the MAE but we thought you would like to read our customers' comments. The following are actual unedited comments from correspondence about the MAE:

"Excellent Development Package."

"Compares to DEC and INTEL."

"I like MAE and wish that you had it on the Macintosh."

"It is a superb program."

A Star is Born.

TelStar 64™
by Eastern House

A Communications Cartridge for the Commodore 64.

Upload/Download, Status Line, etc. Works with your Commodore 1600 or 1650 Modem. Auto-dialing, etc. when used with the new CBM 1650 Modem.

Cartridge and Manual – $49.95

Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 748-8446
Send for free catalog!

VISA
MasterCard

IT'S HERE!

DiskMaker™

with MasterKey™

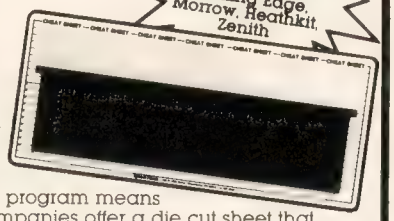
COMPLETELY AUTOMATIC DISK BACKUP-COPY SYSTEM

24 hr. Order Line
805-687-1541 Ext. 54
Technical Line 805-682-4000 Ext. 33

3463 State Street • Suite 1541D • Santa Barbara • CA 93105

Blank "Cheat" Sheets?

NEW! For IBM PC/XT, Apple II, II+, IIe, IIc, Commodore 64, Leading Edge, Morrow, Heathkit, Zenith



You've got the best computer in the world, and lots of software to run on it. One problem. Unless you work with these programs everyday, it's hard to keep all those commands straight. "F5" in one program means one thing, and "F5" in another program means something else. A few companies offer a die cut sheet that attaches to your keyboard with **all** the commands of one program printed on it. Great idea, unless you only need a few easy-to-find "hints," or you need them for 10 or 20 programs. Our solution? Simple. A pack of 12 lined cards, die cut to fit your keyboard and just waiting to be filled with those problem commands **you** forget most often. Simple? Yes, but effective. Now you can have **all** your program commands right at your finger tips on YOUR VERY OWN, custom designed "cheat" sheets. Great for offices and schools. Order a couple packs today!

Please send me the following:

Computer type _____

Qty.	Item	Price
____	Sets of 12 Keyboard Cheat Sheets @ $16.95	$ ____
____	2 Packs (24 Sheets) for $28.95	$ ____
	Shipping and Handling	$ 2.00
	5% State Tax (WI Residents only)	$ ____
	TOTAL ENCLOSED	$ ____

☐ Please Charge to: ☐ MasterCard ☐ VISA

Number _____ Expires _____

SHIP TO: Name _____
Address _____
City _____
State/Zip _____

Dealer Inquiries Invited

Bytes & Pieces, Inc.

550 N. 68th Street
Wauwatosa, WI 53213
414/257-1214

ALL THE BEST PRICES

commodore

M-801 Dot Matrix Parallel $219.00
MCS 801 Color Printer $499.00
1520 Color Printer/Plotter $129.00
1530 Datasette $69.99
1541 Disk Drive $249.00
1600 Vic Modem $59.99
1610 Vic Term 40 ..... $59.99
1650 Auto Modem $89.99
1702 Color Monitor $249.00
DPS Daisywheel Printer $459.00
Desk Organizer Lock $49.99
1311 Joystick...each $4.99
1312 Paddles $11.99
1110 VIC 8K $42.99
1111 VIC 16K $69.99
IEEE/RS-232 Interface $42.99
1211 Super Expander $63.99

MSD DRIVES

SD 1 Disk Drive $359.00
SD 2 Disk Drive $589.00

CARDCO

Light Pen $32.99
3 Slot VIC Expansion Interface $32.00
6 Slot Expansion Interface $79.99
Cassette Interface $29.99
Parallel Printer Interface $49.99
Parallel Interface w/Graphics $69.99

ORANGE MICRO

Grapper CD Interface $119.00

TYMAC

C64 Printer Interface $99.99

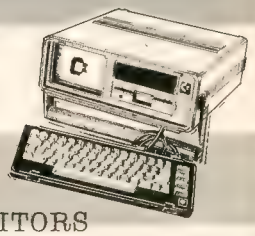
PRINTERS

C. ITOH

Gorilla Banana $149.00
Prowriter 8510P $379.00
Prowriter 1550P $599.00
A10 (18 cps) Son of Starwriter $569.00
F10-40 Starwritter $999.00
F10-55 Printmaster $1349.00

SX-64 PORTABLE

Call for CBM 4 plus $839



Commodore 64 ..... $199
VIC 20 ..... CALL

COMREX

ComWriter II Letter Quality $449.00

EPSON

RX-80, RX SOFT, RX-100, FX 80, FX-100 CALL

JUKI

6100 ..... $469.00

MANNESMAN TALLY

160L $589.00
180L $749.00
Spirit 80 ..... $259.00

NEC

8027 Dot Matrix $389.00

OKIDATA

82, 83, 84, 92, 93, 2350, 2410 ..... $CALL

OLYMPIA

Compact 2 ..... $479.00
Compact RO $509.00
ESW 3000 ..... $1449.00

SMITH CORONA

TP-1000 ..... $449.00

SILVER REED

500 Letter Quality $449.00
550 Letter Quality $649.00
770 Letter Quality $869.00

TOSHIBA

1340 ..... $829.00
1351 ..... $1449.00

TRANSTAR

120P $469.00
130P $649.00
315 Color $459.00

MONITORS

AMDEK

300 Green $129.00
300 Amber $149.00
New Color 300 ..... $289.00

BMC

1201 (12" Green) $88.99
1201 Plus (12" Green Hi Res) $98.90
9191 Plus Color $249.00

GORILLA

122" Green $88.99
12" Amber $95.99

NEC

JB 1201 Green $149.99
JB 1205 Amber $159.99
JB 1215 Color $259.00

SAKATA

SC-100 Color $269.00
SG-1000 Green $129.00
SG-1000 Amber $139.00

TAXAN

100 12" Green $125.00
105 12" Amber $119.00

USI

Pi 1, 9" Green $99.99
Pi 2, 12" Green $119.99
Pi 3, 12" Amber $129.00
Pi 4, 9" Amber $119.99
1400 Color $269.99

ZENITH

ZVM122 Amber $99.99
ZVM123 Green $89.99

PERSONAL PERIPHERALS

Super Sketch Graphics Pad $39.99

KOALA

C64 Koala Pad ROM $79.99

SOFTWARE

ATARISOFT (C-64/VIC)

Jr. Dug $34.99
Defender $34.99
Robotron 2084 ..... $34.99
PacMan $34.99
Donkey Kong $34.99
Centipede $34.99
Stargate $34.99

COMMODORE (64)

C-64 Reference Guide $18.99
EasyCalc $65.00
Easy Finance I, II, III, IV $19.99
Easy Mail $19.99
Easy Script $39.99

CBS (64)

Addition & Subtraction $16.00
Linear Equation $16.99
Multiplication & Division $16.99
Quadratic Equations $16.99

CONTINENTAL SOFTWARE (64)

The Home Accountant $49.99

CSA (64)

PractiCalc $39.99
Practifile $49.99

DESIGNWARE (64)

Crypto Club $29.99
Trap a Zoid $29.99

DYNATECH (64)

Codewriter $75.99

ELECTRONIC ARTS (64)

Pinball Construction $29.99
Cut & Paste $39.99
Hard Hat Mack $75.99

EPYX (6-64/VIC)

Temple of Apshai $29.99
Upper Reaches of Apshai $16.99
Jumpman Junior $29.99

HES (64)

Tri math $22.99
The Pit $12.99
Ghost Manor $12.99
Pool Challenge $14.99
Hes Mon 64 ..... $29.99
Hes Writer 64 ..... $23.99

INFOCOM (64)

Zork I, II, III ..... [illegible]
Deadline ..... [illegible]
Witness ..... [illegible]

PROFESSIONAL SOFTWARE (64)

Word Pro 64 plus Spell $59.99
Trivia Fever $29.99

PROGRAM INTERNATIONAL

Superbase 64 ..... $69.99

SPINNAKER (64)

Snooper Troops 1 or 2 ..... $29.99
Delta Drawing ..... [illegible]
Kids on Keys ..... [illegible]

SCREENPLAY (64)

Wylde $22.99
Kaiv $22.99
Pogo Joe $20.90

SUB LOGIC (64)

Flight Simulator II $40.99

SYNAPSE (64)

Zaxxon $29.99
Protector II $23.99
Blue Max $24.99

COMPUTER MAIL ORDER

VISA

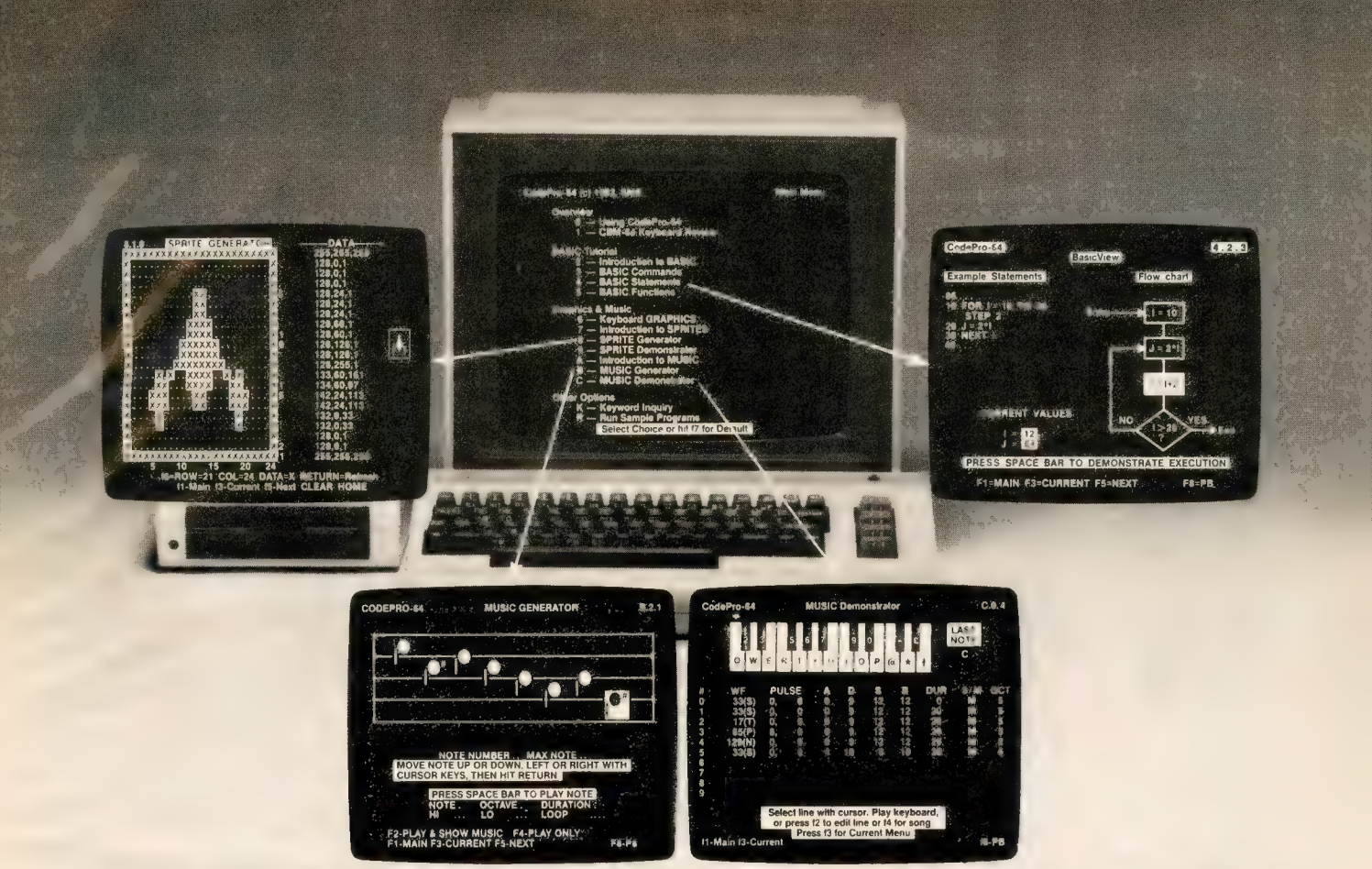
MasterCard

west
800-648-3311
In NV call (702)588-5654, Dept. 115
Order Status Number: 588-5654
P.O.Box 6689
Stateline, NV 89449

canada
Ontario/Quebec 800-268-3974
Other Provinces800-268-4559
In Toronto call (416)828-0866, Dept. 115
Order Status Number: 828-0866
2505 Dunwin Drive, Unit 3B
Mississauga, Ontario, Canada L5L1T1

east
800-233-8950
In PA call (717)327-9575, Dept. 115
Order Status Number: 327-9576
Customer Service Number: 327-1450
477 E. 3rd St., Williamsport, PA 17701

No risk, no deposit on C.O.D. orders and no waiting period for certified checks or money orders. Add 3% (minimum $5) shipping and handling on all orders. Larger shipments may require additional charges. NV and PA residents add sales tax. All items subject to availability.



Simply Incredible. Incredibly Simple.
CodePro-64 For Your Commodore.
Instructional Software That Will Amaze You With What You Learn.

CodePro-64 is the easy way to learn.
CodePro-64 astonishes you with how much you can learn. And how easy learning can be. With CodePro-64, you'll learn to write your own programs. You'll develop advanced programming skills with graphics, sprites and music. And best of all, you'll learn visually.

CodePro-64 is a complete package.
First and foremost, it's a comprehensive BASIC language tutorial. With it, you learn by seeing as well as by doing. You watch variables change value. You see statement branching occur. You can even see "For-Next" statements executed.

There's graphics instruction, too.
CodePro-64 also has a SPRITE Demonstrator and Generator. With it, you'll master the concepts and techniques of graphics programming with sprites. And you'll be able to create and save your own sprites for use in your programs.

And we don't forget the music.
You'll use the MUSIC Demonstrator and Generator to learn how to get the musical effect you want. Exactly. And in seconds. You'll use it to compose simple tunes on the screen and then save the tune to a diskette file.

Discover how good CodePro-64 is.
We ship CodePro-64 as a package of 16 integrated programs, distributed on two diskettes, and containing sample programs for unlimited use. It is supported by a 140-page manual and is packaged in an attractive three-ring binder.

CodePro-64. Incredible. And simple. And only $59.95.

How To Order...CodePro-64—$59.95
(Requires Commodore 64 with disk drive)

CP-640 CodePro-64 _____ × $59.95 = _____
Shipping (US & Canada orders): + $ 3.00
Shipping (Foreign orders add): + $15.00
N.C. Orders add 4½% Sales Tax: + _____
CodePro-64 Total: _____

For quicker response on credit card orders, call...
Toll Free 1-800-762-7874 (In North Carolina 919-787-7703)

Our Guarantee
Try your copy of CodePro-64 for 10 days. If you are not completely satisfied, return it to us undamaged and we'll refund your money. No questions asked. Dealer inquiries invited.

SYSTEMS MANAGEMENT ASSOCIATES
3700 Computer Drive, Dept. CPG
Raleigh, North Carolina 27609

Mail to...

Name PLEASE PRINT

Address (No P.O. Boxes, please)

City, State, Zip

Method of Payment—No CODs, please
☐ Check or Money Order (US Funds Only) ☐ VISA ☐ MasterCard

Card Number Expiration Date

Signature

CodePro-64 is a trademark of Systems Management Associates. ©SMA 1984

Software Discounters of America

For Orders Only 1-800-225-SOFT*

Inquiries and PA. 412-361-5291

S.D. of A

Open Saturday

Commodore 64 Software

ACCESS
Beach Head (T/D) ... $23
Raid Over Moscow (T/D) ... $26
Spritemaster (T/D) ... $21
ACTIVISION
Beamrider (D) ... $25
Decathalon (D) ... $25
H.E.R.O. (D) ... $25
Pitfall II (D) ... $25
River Raid (D) ... $25
*$5 Instant Rebate with purchase of 3 titles
ARTWORX
Bridge 4.0 (T/D) ... $16
Monkeymath (T/D) ... $18
Strip Poker (D) ... $21
BATTERIES INCLUDED
Buscard II ... Call
Checkbook (D) ... $21
80 Column Board ... $145
Electronic Address Book (D) ... $21
Home Inventory (D) ... $21
Mail List (D) ... $21
Paperclip (D) ... $59
Paperclip w/Spellpak $79
Recipes (D) ... $21
Stamps (D) ... $21
The Consultant (D) ... $67
BOOKS
Book of Adv. Games $16
Book of Commodore Software 85 ... $13
Commodore 64 User's Encyclopedia ... $13
Commodore 64 Color Graphics ... $12
Games Commodores Play ... $12
Kids and the C64 ... $16
Shortcut Through Adventureland I ... $9
Shortcut Through Adventureland II (Infocom) ... $9
BRODERBUND
AE (D) ... $21
Bank St. Writer (D) ... $43
Castles Dr. Creep (D) $21
Championship Loderunner (D) ... $23
Choplifter (R) ... $25
David's Midnight Magic (D) ... $19
Drol (D) ... $23
Gumball (D) ... $19
Mask of the Sun (D) ... $25
Operation Whirlwind (D) ... $25
Raid on Bungeling Bay (D) ... $21
Seafox (D) ... $21
Spelunker (D) ... $21
Stealth (D) ... $21
Whistler's Brother (D) $19
CBS
Add/Subt (T/D) ... $16
Astro-Grover (R) ... $33
Big Bird's Funhouse (R) ... $33
Big Bird's Special Delivery (D) ... $23
Dinosaur Dig (D) ... $33
Duck's Ahoy! (R) ... $23
Ernie's Magic Shapes (R) ... $25
Fractions (T/D) ... $19
Goren Bridge (D) ... $53
Match Wits (D) ... $19
Math Mileage (D) ... $19
Mastering SAT (D) ... $99
Mult/Div (T/D) ... $16
Murder by Dozen (D) ... $23
CONTINENTAL
FCM (D) ... $33
Get Rich Series ... Call
Home Accountant (D) $47
Home Cataloger (D) ... $33
CREATIVE
Bumblebee (D) ... $19
Crisis Mountain (R) ... $21
Dragonhawk (D) ... $21
In the Chips (D) ... $19
Moondust (R) ... $21
Save New York (R) ... $21
DATASOFT
Bruce Lee (D) ... $23
Dallas Quest (D) ... $23
Letter Wizard (D) ... $33
Pooyan (T/D) ... $19
DESIGNWARE
Creature Creator (D) ... $21
Math Maze (D) ... $25
Spellicopter (D) ... $25
Trap-A-Zoid (D) ... $25
EPYX
Dragonriders Pern (D) $25
FAX (D) ... $19
Gateway Apshai (R) ... $25
Impossible Mission (D) ... $23
Jumpman (T/D) ... $25
Jumpman Jr. (R) ... $25
Oil Barons (D) ... $39
Pitstop (R) ... $25
Pitstop II (D) ... Call
Puzzlepanic (D) ... $23
Summer Games (D) ... $25
Temple of Apshai (T/D) ... $25
Worlds Greatest Baseball (D) ... $23
FISHER PRICE
Alpha Build (R) ... $19
Dance Fantasy (R) ... $19
Hop Along Counting (R) ... $19
Linking Logic (R) ... $19
Memory Manor (R) ... $19
Number Tumbler (R) ... $19
Sea Speller (R) ... $19
Up & Add 'Em (R) ... $19
FIRST STAR
Astro Chase (T/D) ... $19
Bristles (T/D) ... $19
Flip Flop (T/D) ... $19
HBJ
Computer SAT (D) ... $59
HES
Factory (D) ... $16
Graphics Basic (D) ... $23
HES Modem I ... $47
HES Modem II ... Call
HES MON 64 (R) ... $25
HES Games 84 (D) ... $23
Multiplan (D) ... $65
Paint Brush (R) ... $18
Space Station (D) ... $25
Turtle Graphics II (D) $25
Type 'N' Write (D) ... $21
INFOCOM
Cut Throats (D) ... $23
Deadline (D) ... $29
Enchanter (D) ... $23
Infidel (D) ... $26
Planetfall (D) ... $23
Sea Stalker (D) ... $23
Sorcerer (D) ... $26
Suspended (D) ... $29
Witness (D) ... $23
Zork I, II or III (D) ... $25
KOALA
Touch Tablet w/Painter (D) ... $65
Touch Tablet w/Painter (R) ... $75
Muppet Learning Keys ... Call
Paint-A-Rhyme (D) ... $21
Programmer's Guide (D) ... $13
Spider Eater (D) ... $21
MICROLAB
Boulder Dash (D) ... $21
Death Caribbean (D) ... $23
Dino Eggs (D) ... $23
English SAT I (D) ... $19
Heist (D) ... $21
Math SAT I (D) ... $19
MICROPROSE
F-15 (T/D) ... $23
Hellcat Ace (D) ... $19
Solo Flight (T/D) ... $23
Spitfire Ace (D) ... $19
PRECISION SOFTWARE
Superbase 64 (D) ... $67
PROFESSIONAL SOFTWARE
Trivia Fever (D) ... $27
Word Pro 3 +/Spell Right (D) ... $65
RESTON
Miner 2049er (R) ... $25
Movie Maker (D) ... $35
SCARBOROUGH
Mastertype (D or R) ... $25
Songwriter (D) ... $25
SIERRA ON LINE
Champ. Boxing (D) ... $19
Homeword (D) ... $43
Oil's Well (D) ... $19
Quest for Tires (D) ... $23
Story Maker (D) ... $23
Ultima II (D) ... $39
Ulysses (D) ... $23
Wizard & Princess (D) $21
Wiz Math (D) ... $23
Wiz Type (D) ... $23
SPINNAKER
Adventure Creator (R) $25
Aegean Voyage (R) ... $25
Aerobics (D) ... $29
Alphabet Zoo (R) ... $21
Bubble Burst (R) ... $21
Cosmic Life (R) ... $21
Delta Drawing (R) ... $25
Facemaker (R) ... $21
Fraction Fever (R) ... $21
Grandma's House (D) $21
Hey Diddle (D) ... $19
Jukebox (R) ... $21
Kids on Keys (R) ... $21
Kidwriter (D) ... $21
Kindercomp (R) ... $21
Most Amazing Thing (D) ... $25
Ranch (R) ... $21
Snooper Troops 1 (D) $25
Snooper Troops 2 (D) $25
Story Machine (R) ... $21
Trains (D) ... $25
SSI
Baltic 85 (D) ... $23
Battle Normandy (D) ... $25
Broadsides (D) ... $25
Carrier Force (D) ... $39
Combat Leader (D) ... $25
Computer Baseball (D) ... $25
Computer QB (D) ... $25
Cosmic Balance (D) ... $25
Epidemic (D) ... $23
Field of Fire (D) ... $25
50 Mission Crush (D) $25
Fortress (D) ... $23
Geopolitique 1990 (D) $25
Germany 1985 (D) ... $39
Knights In Desert (D) $25
Pro Tour Golf (D) ... $25
Questron (D) ... $33
RDF 1985 (D) ... $23
Rails West (D) ... $25
Ringside Seat (D) ... $25
Tigers In Snow (D) ... $25
SUBLOGIC
Flight Simulator II (D) $35
Night Mission Pinball (T/D) ... $21
SYNAPSE
Blue Max (T/D) ... $21
Encounter (T/D) ... $21
Ft. Apocalypse (T/D) ... $21
Necromancer (T/D) ... $21
Pharoah's Curse (T/D) $21
Sentinel (T/D) ... $21
Slamball (T/D) ... $21
Zaxxon (T/D) ... $25
Zepellin (T/D) ... $21
TIMEWORKS
Cave Word Wizard (D) $23
Data Manager (T/D) ... $17
Data Manager 2 (D) ... $33
Elect. Checkbook (T/D) ... $17
Evelyn Wood Reader (D) ... $47
Money Manager (T/D) $17
Programming Kit 1, 2 or 3 (T/D) ... $17
Robbers Lost Tomb (T/D) ... $17
Spellbound (T/D) ... $17
Word Writer (D) ... $33
TRILLIUM
Amazon (D) ... $27
Dragonworld (D) ... $27
Fahrenheit 451 (D) ... $27
Rendezvous w/Rama (D) $27
Shadowkeep (D) ... $27
TRONIX
Chatterbee (D) ... $25
Pokersam (D) ... $19
S.A.M. (D) ... $39
WAVEFORM
Musicalc 1 (D) ... $35
Musicalc 2 or 3 (D) ... $23
Colortone Keyboard ... $59
WINDHAM CLASSICS
Below The Root (D) ... $23
Gulliver's Travels (D) $23
Swiss Family Robinson (D) ... $23
Wizard Of Oz (D) ... $23
ACCESSORIES
Alien Group Voice Box ... Call
BASF SS, DD, ... $17/Bx
Cardco Access. ... Call
Commodore Dust Covers (All Models) ... $6
Compuserve Starter Kit (5 hrs.) ... $25
Compuserve Vidtex ... $25
Disk Case (Holds 50) $12
Disk Drive Cleaner ... $9
Sakata 13" Color Monitor (free shipping) ... $239
Wico Boss ... $12
Wico Bat Handle ... $19
Wico Trackball ... $29

P.O. Box 278—Dept. CG Wildwood, PA 15091

Ordering and Terms: Orders with cashier check or money order shipped immediately. Personal/company checks, allow 3 weeks clearance. No C.O.D.'s. VISA/MASTERCARD accepted with no additional charge for orders shipped to continental U.S.A. **Shipping: Continental U.S.A.** — Orders under $100 add $3; **free shipping on orders over $100.** PA residents add 6% sales tax. **AK, HI, FPO-APO** — add $5 on all orders. **International** — add $15 or 15% of order whichever is greatest. Defective merchandise will be replaced with same merchandise — NO CREDITS! Return must have authorization number (412) 361-5291. Prices subject to change without notice.

CROWN CUSTOM COVERS

Protect Expensive Equipment from Dust/Liquids with a CROWN COVER

★ CUSTOM MADE TO FIT
★ Heavy 32-oz. VINYL ANTI-STATIC
★ EXTENDS EQUIPMENT LIFE
★ Choice of Colors Lt. Tan or Brown

COMPUTERS:
C-64/VIC20 ... 7.00
KEYBOARD COVERS FOR ATARI; APPLE IIe; IBM; KAYPRO; TI99 ... 8.00
DATASETTE (OLD) ... 5.00
DATASETTE (NEW, C2N) ... 5.00

DISK DRIVES:
C-1541 ... 8.00
MSD S/D; APPLE S/D ... 8.00
MSD D/D; APPLE D/D UNIT ... 10.00

PRINTERS (DOT MATRIX):
C-1525; MPS801 ... 10.00
C-1526; BMC BX80; BMC BX80F/T 13.00
GEMINI 10/10X; DELTA 10 ... 13.00
GEMINI 15/15X; DELTA 15 ... 16.00
EPSON MX80; RX80; RX80F/T ... 13.00
EPSON FX80; FX80F/T ... 13.00
EPSON MX100; FX100 ... 16.00
PANASONIC KX-P1090; CARDCO 13.00

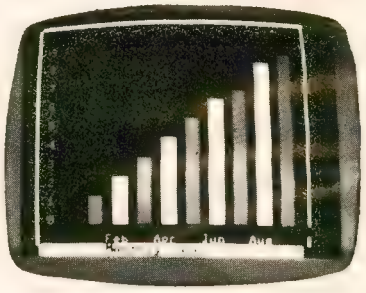
MONITORS:
C-1702 COLOR ... 16.00
BMC COLOR ... 16.00
SANYO CRT 36 (GREEN) ... 14.00
AMDEK COLOR I ... 16.00

VIDEO RECORDERS:
FOR MOST RECORDERS (CUT-OUT FOR CLOCK) ... 13.00

Order by stating NAME and MODEL and COLOR CHOICE TAN or BROWN. Enclose check or M.O. + 1.50 Ship & Hdlg. California Res. Include 6.5*% Sales Tax.

SPECIAL COVERS WILL BE MADE TO YOUR DIMENSIONED SKETCH. SEND YOUR REQUIREMENTS FOR OUR LOW PRICE QUOTES.

CROWN CUSTOM COVERS
9606 SHELLYFIELD ROAD
DOWNEY, CA 90240



BASE-CALC

Base-Calc is an integrated data-base and spreadsheet program for the Commodore 64 and SX-64 computers

* * * FEATURES * * *

* Easy to use — 100% menu driven
* Fast machine-language design
* Search on any of 14 fields
* Screen & hardcopy bar-graphs
* Works with most word-processors
* Excellently written user manual

* * USES * *

* Sales management
* Mailing lists
* Market research
* Inventory control

The uses of **Base-Calc** are only limited by your imagination!

— Send for free brochure —

Cardinal Instruments
4204 Indianola Ave.
Columbus, OH 43214
PH. (614) 262-6776

Only **$39.95**

WE INVITE DEALER INQUIRIES

SPECIAL Commodore 64 Sale

MANNESMANN
SPIRIT 80 ..... $299.00
MTL-160L $559.00
MTL-180L $775.00

NEC
NEC8023 ..... $369.00
NEC8025 ..... $699.00

CITOH
GORILLA GX-100 ..... $169 00
GORILLA SERIAL $199 00
PROWRITER II $575 00
8600 ..... $899.00
SHEET FEEDER $425 00
620 ..... $929 00
630 ..... $1699 00
8510 SP $499 00
P510 SCP $559 00
A10 LETTER QUAL $499 00
PROWRITER 8510 ..... $335.00
PRINTMASTER $1199.00
STARWRITER $929.00

EPSON
RX-80 ..... $269.00
RX-80FT $299.00
FX-80 ..... $439.00
FX-100 ..... $639.00

OKIDATA
80 ..... $199.00
82A $299.00
83A $569.00
84 ..... $959.00
92 ..... $409 00

RITEMAN
INFO RUNNER ..... CALL

JUKI
6100 ..... CALL

PANASONIC
1090 ..... $279.00
1091 ..... $309.00
1092 ..... $459.00

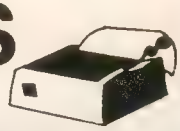
BLUE CHIP
M12010 ..... $279.00
M12010 C-64 ..... $279.00
D4015 ..... $1399.00

LEGEND
880 ..... $259.00
1000 ..... $279.00
1200 ..... CALL
1500 ..... CALL
1018 ..... CALL

STAR MICRONICS
GEMINI 15X $379 00
DELTA 10 ..... $449 00
DELTA 15 ..... $525 00
RADIX 10 ..... $575 00
RADIX 15 ..... $675 00
POWERTYPE ..... $CALL
SWEET P (Model 100) $549 00
STX80 ..... $149 00

GEMINI 10X
..$259.00

SAVE ON THESE IN-STOCK PRINTERS



HESWARE-64
Microsoft Multiplan $59.95
Omni Writer $39.95
Turtle Toyland Jr $21.95
Time & Money Mgr $39.95
Paint Brush $12.95
Hes Games $24.95
The Factory $21.95
Minn. Fats Pool $19.95

INFOCOM-64
Enchanter $32.75
Infidel $32.75
Planetfall $32.75
Witness $32.75
Sorcerer $32.75

SPINNAKER-64
Alphabet Zoo $23.75
Kindercomp $23.75
Kids On Keys $23.75
Facemaker $23.75
Delta Drawing $26.75
Fraction Fever $23.75
Cocmic Life $23.75
Up For Grabs $26.75

SYNAPSE-64
Blue Max $22.75
Shamus $22.75
Shamus II $22.75
Zeppelin $22.75
Zaxxon $22.75

SUB LOGIC-64
Flight Simulator II $32.75
Night Mission Pinball $22.75

TIMEWORKS-64
Electronic Checkbook $18.75
Star Battle $18.75
Data Manager $18.75
Wall St. Manager $18.75

EPYX-64
Jumpman $27 75
Jumpman Jr $27.75
Pitstop $27.75
Gateway to Apshai $27 75
Temple of Apshai $27 75

STRATEGIC SIMULATIONS-64
Knights of the Desert $26 75
Eagles $26.75
Computer Baseball $26.75
Ringside Seat $26.75

EASTERN HOUSE-64
Rabbit Rom $34 75
TelStar 64 ..... $39 95
Assembler Rom $19.95

PERSONAL PERIPHERALS-64
Super Sketch Graphics Tablet $39 95
Joystick $7.75

BRODERBURD-64
Bank St. Writer $39.95
Choplifter $27.95
Seafox $22.95
Spare Change $22.95
Lode Runner $22.95

CARDCO-64
C/?G Printer Interface $69.75
C/?B Printer Interface $39 75
CK/1 Numeric Keypad $34.75
DC/1 Cassette Recorder $39 75
CB/5 5-Slot Expansion $54.00
CR/1 Light Pen $29.75
CE/1 Cassette Interface $29.75
C/02 Write Now $34.75
D/01 Mail List $26.75
D/04 Spell Now $26.75

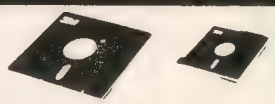
ATARISOFT-64
Pacman $32.75
Donkey Kong $32.75
Dig Dug $32.75
Defender $32.75
Centipede $32.75

CONTINENTAL-64
Home Accountant $44 75
Tax Advantage $35.75
C-64 Users Encyclopedia $12.50

Modem
MITEY MO 79.95

INNOVATIVE CONCEPTS
FLIP-N-FILE 10 ..... $3.75
FLIP-N-FILE 15 ..... $8.95
FLIP-N-FILE 25 ..... $18.95
FLIP-N-FILE 50 ..... $17.75
FLIP-N-FILE (Rom Holder) $17.75

PRINTING PAPER
3000 SHEETS FANFOLD $42 75
1000 SHEETS FANFOLD $19 75
1000 SHEETS LETTER $21 95
200 SHEETS LETTER $8 99
150 RAG STATIONERY $10 99
MAILING LABELS (1 in) $9 75
14x11 1000 FANFOLD $24 75



DISKETTES

SKC
SKC-SSSD 14.75
SKC-SSDD 17.75
SKC-DSDD 21.75

ELEPHANT
5¼" SSSD $16 75
5¼" SSDD $19 95
5¼" DSDD $25 95

MAXELL
5¼" MD-1 ..... $24 75
5¼" MD-2 ..... $34 75

MONITORS

GORILLA
12" GREEN $82 00
12" AMBER $89 00

TAXAN
100 GREEN $115 00
105 AMBER $125 00
210 RGB COMPOSITE $269.00
400 RGB MEDRES $295 00
410 RGB HI RES $349 00
420 RGB HI RES (IBM) $475.00
121 GREEN $145 00
122 AMBER $149 00

SAKATA
SC100 COLOR ... $229.00
SG1000 GREEN $99 00
SA AMBER $109 00

ZENITH
ZVM 122A AMBER $95 00
ZVM 123G GREEN $85.00
ZUM 124 IBM-PC $129 00
ZUM COLOR $275 00
ZUM 133 RGB $389 00
ZUM 135 RGB $449 00
ZUM 136 ..... $589 00

AMDEK
VIDEO 300 ..... $139 00
VIDEO 300A $149 00
COLOR 1+ $269.00
COLOR 11+ $399 00

NEC
JB1260 GREEN $99 00
JB1201 GREEN $145 00
JB1205 ... AMBER $145 00
JC1215 COLOR $269 00
JC1216 ..... $399 00

Lyco Computer Marketing & Consultants

MasterCard TO ORDER VISA

CALL TOLL FREE
800-233-8760
Customer Service 1-717-327-1825

or send order to
Lyco Computer
P O Box 5088
Jersey Shore PA 17740

POLICY

Risk Free–No deposit on C.O.D. orders; free shipping on prepaid cash orders within the continental U.S. APO, FPO, and international orders add $5.00 plus 3% for priority mail service. PA residents add sales tax. Advertized prices show 4% discount offered for cash; add 4% for Master Card or Visa.

THE BANNER MACHINE™ HOLIDAY SPECIAL!
Order before 12/31/84 and receive holiday font free!
Menu-driven program works like a word processor. Great for businesses, schools, or organizations. Produces large signs up to 13" tall by any length. Make borders of widths up to ¾". Eight sizes of letters from ¾" to 8" high. Proportional spacing, automatic centering, right and left justification. Use with Gemini 10 or 10X, Epson MX with Graftrax, or the RX or FX, Commodore 1525E or MPS 801, and the Banana. Four extra fonts available ($19.95 each). Tape or disk $49.95

HOME FINANCE MANAGER
Keep records of tax deductions, bank payments, monthly charges, individual item expenses, and check transactions. User friendly, menu driven. Modify or delete records with ease. Data entry in dozens of categories (more than 500 transactions per month). Review by category, date, or tax status. Print monthly reports, sort information and print tax reports. Tape or disk $49.95

ditto
COPY DISKS AUTOMATICALLY
$39.95

- Copies 89% of currently available Commodore 64 disks.
- Supports 1 or 2 1541 drives.
- Takes approximately 25 minutes.
- Easy to use menu driven.
- Currently available—future updates $17.
- ditto will even backup ditto.

1541 Physical Exam
$39.95

- Checks electronics
- Speed disk clamping
- Radial head alignment
- Mechanical stop location
- Includes new quiet drive stop

Other programs available:

- Grade Organizer
- Chessmate 64
- Screendump
- Disk Organizer
- Menu Driven Disk Operating System
- CP/M Term
- CP/M Utilities

FLEX FILE
DATA BASE with Report Writer and Mail Labels

• Easy to learn (takes about 2 hours) • save up to 1500 typical records on a 1541 disk drive • Sort on multiple keys & select records 9 ways. • Print information on labels or in report format. • Calculate report columns • Flexible structure, change record size, field number, ways the file can be ordered, etc. with ease. • Compatible with many popular word processors to create form letters or reports. 1541 • 4040 • 9031 Disk $59.95.

ORDER TOLL FREE 10-6 MON-SAT
800-762-5645
Cardinal Software
13646 Jeff Davis Hwy.
Woodbridge, VA 22191
Catalogs available. Specify: Business/Utilities, Games, Education, CP/M Public Domain.
Info. Call (703) 491-6509

For Your Commodore 64

THE DOCTOR IS IN!

Meet ELIZA, the computer psychotherapist.

Created at MIT in 1966 to run on a large mainframe, ELIZA has become the world's most celebrated artificial intelligence program. ELIZA will analyze any statement you enter and respond in true Rogerian fashion - and her remarks are often amazingly appropriate!

Unlike the stripped down versions you may have seen, our ELIZA has retained the full power and range of expression of the original mainframe program.

Best of all, ELIZA comes with the complete Source Program (written in BASIC) ... anyone, even a beginner, can easily customize ELIZA's responses.

So next time people ask you what your computer can do, bring out ELIZA and show them!

ONLY $45
Specify disk or cassette
Please add $3.00 for shipping and handling
(California residents add 6½% sales tax.)

Checks, MasterCard, and VISA accepted

"You'll be impressed with Eliza ... a convincing demonstration of artificial intelligence" - PC magazine

Artificial Intelligence RESEARCH GROUP
921 N. La Jolla Ave., Dept. G, Los Angeles, CA 90046
(213) 656-7368 • (213) 654-2214

Be the TRAIN DISPATCHER

Play this fast-paced computer video game that's so true-to-life that a major railroad indicated they use it in dispatcher training.

TRAIN DISPATCHER's 24 displays help you make crucial decisions, RAPIDLY. You're under pressure, but in control — throwing switches, clearing and cancelling signals, constantly maneuvering both east and westbound trains. Keep the tracks clear ahead of all your trains and watch your score go up!

Action packed, yet non-violent, TRAIN DISPATCHER's 5 levels of play challenge players from age 8 to 80. Work your way up from "Cub Dispatcher" to Chief Dispatcher" or even "Trainmaster."

Created by designers of computerized traffic control systems for operating railroads, TRAIN DISPATCHER will increase your appreciation for actual railroad operations.

TRAIN DISPATCHER comes complete with Instruction Manual and keyboard template.

Color TV Recommended

CHECK ONE:

Vic 20™ Tape ☐ or Disk ☐
(Requires 16 K Memory Expander) . . . ($24.95)
Atari® 800 Tape ☐ or Disk ☐
(Requires Basic) . . . . . ($24.95)
Atari® 400 Tape ☐
(Requires Basic) . . . . . ($24.95)
Commodore™ 64 Tape ☐ or Disk ☐ . . . ($24.95)
Apple II® Disk ☐ . . . . . ($29.95)
Manual Only ☐ ($4.00 if purchased separately)

Name _____
Street _____
City _____ State _____ Zip _____

USA & CANADA add $2.50 postage & handling ($4.00 foreign) for each game ordered. All payments must be in USA funds; all foreign payments must be against USA banks. PA residents add 6% state sales tax. Or charge to.

☐ Master Card ☐ VISA Exp. Date _____
Card No. _____
Signature _____

SEND TO: SIGNAL COMPUTER CONSULTANTS, LTD. • P.O. Box 18222 • Pittsburgh, PA 15236 • (412) 655-7727

PRE-CHRISTMAS VIC - 20 MEMORY SALE

16K MEMORY EXPANSION
NOW ONLY $39.95
SPECIAL SALE PRICE!

★ 14 Day Money Back Guarantee
★ Boosts VIC to 21K RAM
★ Top Quality, Fully Tested
★ 90 Day Warranty

CARDCO 3 SLOT EXPANSION BOARD $28.95

for IMMEDIATE SHIPMENT on Credit Card Orders
Call: (303) 245-9012
9 AM - 9 PM MST Every Day
ASSEMBLY TECHNOLOGY
2692 Hwy 50 Suite 210
Grand Junction, CO 81503

Personal checks allow 3 weeks
Shipping & handling $2.50
Colorado Residents add Sales Tax
COD add $2.50

ROBOTS

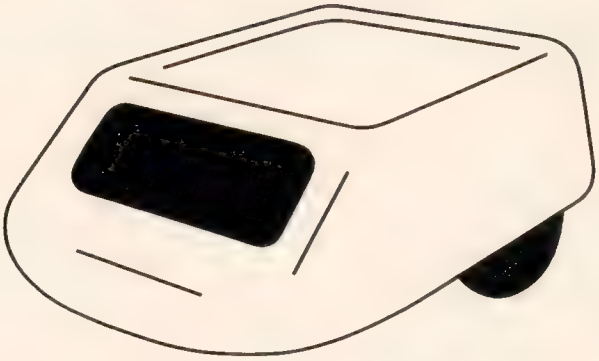
Let NOMAD introduce you to the AGE OF PERSONAL ROBOTS
THE NOMAD ROBOT! AFFORDABLE! FUN! EDUCATIONAL!

IS NOMAD INTELLIGENT?
YES! Your C-64 or VIC is NOMAD's brain.

CAN NOMAD MOVE ABOUT?
YES! NOMAD accurately travels forward, reverse, and pivots left and right using industrial type stepper motors.

CAN NOMAD SEE?
YES! NOMAD has ultrasonic sight, ranging and motion detection capabilities.

DOES NOMAD COME WITH SOFTWARE?
YES! NOMAD comes complete with ready to run software including a friendly robot language for creating your own programs.

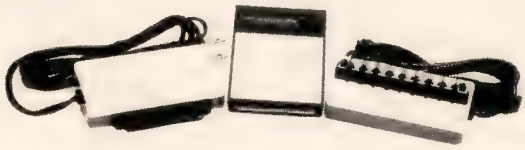


$179.95

HOME CONTROL

HOME SECURITY AND ENERGY MANAGEMENT PRODUCTS

VIController. Wireless home control using BSR or Leviton receiver modules. Software included. $69.95
COMclock/AB Autoloads and runs program at power-up. Battery backed up clock. (C-64 only) $69.95
COMsense. Provides 4 open/close and 2 analog inputs. Great for security $69.95
SUPER SCHEDULE PLUS Control software utilizing above three products. (C-64 only) $19.95



SPECIAL PACKAGE PRICE **$199.95**

SPEECH

COMVOICE! THE EASY TO USE SPEECH SYNTHESIZER FOR THE C-64

SPEECH IS AS EASY AS 1-2-3!
1) Plug COMvoice in.
2) Turn computer on.
3) Type SPEAK "HELLO, HOW ARE YOU"

AS EASY TO USE AS A PRINT STATEMENT!

$99.95

W/EXTERNAL SPEAKER $139.95

EDUCATIONAL DEMO & AARDVARK ADVENTURE SOFTWARE AVAILABLE

GENESIS COMPUTER CORPORATION • P.O. BOX 152 • HELLERTOWN, PA 18055

DEALER INQUIRIES INVITED • **(215) 861-0850** • MC & VISA Accepted

HAVE YOU BEEN DRIVEN CRAZY TRYING TO BACKUP YOUR EXPENSIVE SOFTWARE? NOW YOU CAN RELAX!

DITTODISK·64™

DITTODISK 64 is a utility program that has been tested and found to be capable of copying most protected disks produced by the major software houses. A notable attribute of this copy program is its lack of a large manual. There are no menus and no disk analysis routines. The screen prompts will be all that you'll need to get you through 99+% of your copying.

DISK ONLY $39.95

THE BEST YOU CAN BUY

Dealers inquiries invited!!!

NEW

VIC & 64

BE A COPY C A D. (CASSETTE AIDED DUPLICATOR) NOW YOU CAN MAKE BACKUP COPIES OF ALL THE COSTLY, NON-SAVEABLE CASSETTE PROGRAMS YOU BOUGHT.

OUR BACKUP V1.0 UTILITY PROGRAM WILL LET YOU MAKE DUPLICATES THAT RUN.

BACKUP V1 0 WILL WORK WITH A STANDARD 5K UNEXPANDED VIC MEMORY EXPANSION IS REQUIRED TO COPY PROGRAMS LONGER THAN 3K BYTES.

TAPE $24.95

ORDERING INFORMATION

ADD $2.00 PER ORDER FOR SHIPPING.
WE ACCEPT VISA, MASTERCARD, CHECKS, M.O.
C.O.D. ADD $3 00 EXTRA.
California Residents, Add 6% Sales Tax to Orders

VISA

SOFTWARE PLUS

MasterCard

6201 C Greenback Lane (916) 726-8793 Citrus Heights, CA 95610

STOP PLAYING GAMES

NEW Disk Commodore 64

- Calculate odds on HORSE RACES with ANY COMPUTER using **BASIC**.
- SCIENTIFICALLY DERIVED SYSTEM really works TV Station WLKY of Louisville, Kentucky used this system to predict the odds of the 1980 Kentucky Derby See *Popular Computing* (February, 1984) for a review of this program This system was written and used by computer experts and is now being made available to home computer owners This method is based on storing data from a large number of races on a high speed, large scale computer 23 factors taken from the "Daily Racing Form" were then analyzed by the computer to see how they influenced race results. From these 23 facts, ten were found to be the most vital in determining winners NUMERICAL PROBABILITIES of each of these 10 factors were then computed and this forms the basis of this REVOLUTIONARY NEW PROGRAM
- SIMPLE TO USE Obtain "Daily Racing Form" the day before the races and answer the 10 questions about each horse Run the program and your computer will print out the odds for all horses in each race COMPUTER POWER gives you the advantage!
- YOU GET
  1) Program on cassette or disk
  2) Listing of BASIC programs for use with any computer
  3) Instructions on how to get the needed data from the "Daily Racing Form"
  4) Tips on using the odds generated by the program
  5) Sample form to simplify entering data for each race

——————MAIL COUPON OR CALL TODAY——————

3G COMPANY, INC. DEPT. GA **(503) 357-5607**
RT. 3, BOX 28A, GASTON, OR 97119

Yes, I want to use my computer for FUN and PROFIT. Please send me "Play the Horses" for **$29.95**. Circle the cassette you need: VIC-20, Color Computer, TRS-80, Sinclair Timex 1000, Atari, Commodore 64 (disk or cassette), Apple (disk), IBM (disk).

Enclosed is: ☐ check or money order ☐ MasterCard ☐ Visa

Card No Exp date

NAME

ADDRESS

CITY STATE ZIP

START USING YOUR COMPUTER FOR FUN and PROFIT!

Now there's PASCAL for the Commodore 64. And at a mini price.

Kyan PASCAL is a *full-featured implementation* of PASCAL —not a subset! With these features:

- ☐ high-performance compiler and comprehensive set of error messages for faster debugging
- ☐ speeds *up to 40 times faster* than Commodore Basic
- ☐ built-in full screen editor
- ☐ support for files, pointers, record types, sets and ordinal types used in sophisticated data structures.
- ☐ plus, a comprehensive tutorial manual illustrating the speed and power of PASCAL through sample programs.

Kyan PASCAL lets you develop programs on your Commodore 64 that are transportable to most mainframes. So it's perfect for students and working at home.

Try it for 15 days.

Order Kyan PASCAL, and if you're not completely satisfied, return the diskette and manual within 15 days for a full refund.

Kyan PASCAL with complete tutorial manual $49.95
(Add $4.50 per copy for postage and handling. $9.50 outside North America. California residents add 6.5% sales tax.)

To order, call 415/775-2923.
(VISA and MasterCard accepted.)

Or send check or money order to: ***Kyan Software, Suite 183, 1850 Union Street, San Francisco, CA 94123.***
Sorry, no C.O.D. orders accepted.

kyan

DON'T

SPEND ANOTHER DIME ON ANY OTHER GAME UNTIL YOU EXPERIENCE

-the Challenge-
-the Suspense-
-the Power of-

SALVAGE

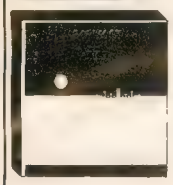
Graphic Adventure Game Series

Salvage I

Explore the sunken S.S. Commodore. Can you defy the curse and recover the valuable treasures below?

Salvage II

Unlock the secrets of an evil Alien Race from Outer Space and return with just two items-a valuable gem . . . and your life!



Salvage III

Conquer the Ultimate Adventure Challenge! Expose the traiterous spy who sabotaged the ship and murdered its crew for millions in GOLD! Computer Generated Graphics in every program shows your salvage boat, the sunken ship, diver location and more.

-for Commodore 64 and Vic $27.95 DISK $24.95 CASSETTE Order all three for only $65.00 and we will send you our $27.95 Action Arcade BATTLESHIP game absolutely FREE! - send check or money order to

Dynastar Productions

P.O. Box 508, Toano, VA. 23168 804/564-0087

Dealer Inquiries Invited

IT'S HERE!

DiskMaker™

with MasterKey

COMPLETELY AUTOMATIC DISK BACKUP-COPY SYSTEM

24 hr. Order Line
805-687-1541 Ext. 74
Technical Line 805-682-4000 Ext. 88

beak

3463 State Street · Suite 1541C · Santa Barbara · CA 93105

PC GALLERY

P.O. Box 3354 Cherry Hill, N.J. 08034

Toll FREE (800) 992-3300

For Information Call (609)596-1944

Call us for reliable service, experience and affordable prices!

CMD 64 ..... $Call

1541 $Call

1520 Color Plotter $109
MPS 801 Printer $205
1530 Datasette $64
1650 Auto Modem $86
1702 Monitor ..... $CALL
Int'l Soccer $21
1011 RS 232
Terminal Interface $42
1211 Super Expander $39
EZ Back up $25
Magic Voice Speech $49.95

Repeat of a Sellout
1526 PRINTER
$269

Special of the Month
ELEPHANT DISK
SS/SD $15.50 SS/DD $16.50

WORD PROCESSING
Bank Street Writer $45
Paper Clip $69
Easy Script $45
Word Pro 64 ..... $58
EZ Spell $19

PROGRAMMING SERIES
Assembler 64 ..... $36
Logo $52
Pilot $39
Simon Basic $44
Screen Editor $19
Nevada Fortran $39
Nevada Cobol $39

ACCOUNTING
Home Accountant $45
Tax Advantage $45
General Ledger $35
A/R, A/P, Payroll $35

DATA BASES
Code Writer $64
Mirage Database Mgr. $79
Super Base 64 ..... $77

Special of the Month
The Consultant
Formerly Delphi Oracle **$65.00**

Special of the Month

Gemini 10X
$258

PRINTERS
EPSON ..... $ CALL
OKIDATA ..... $CALL
Silver Reed ..... $Call

STAR
Gemini 10X $266
Gemini 15X $366
Powertype $395

SURGE PROTECTOR
4 Outlet $37.95

MSD DISK DRIVE
SD1 Disk Drive $335
SD2 Dual Disk Drive ..... $Call

CARDCO
+G Printer Interface $66
Numeric Keypad $29.50
Light Pen $31
5 Slot Expansion $49
Datasette $47
TYMAC Connection $79

SPREAD SHEET
Multiplan $63
Calc Results $34
Practicalc $38
Koala Pad (disc) $65

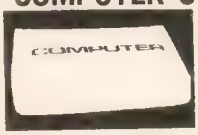
Special of the Month
SD1 Disk Drive $335
SD2 Disk Drive $495

ELECTRONIC ARTS
One on One $29.95
Mule $29.95

ATARISOFT
Donkey Kong $29
Pole Position $35

INFOCOM
Zork I, II, III ..... $29 ea.
Suspended $29
Starcross $29
Deadline $29
Introductory Price
Zaxxon $29.95

COMPUTER COVERS



Features heavy duty canvas with vinyl interior - waterproof

Reg. $15.95 **$6.99**

CMD 64 ..... $6.99
VIC 20 ..... $6.99
Disk Drive $6.99
Espon MX 80 ..... $7.99
Espon MX 80 FT $7.99
Okidata 92 ..... $7.99

Ordering & Payment Policy

Prices reflect a cash discount. For C.O.D., Visa, and Mastercard add 3% Immediate delivery with certified check or wired funds. N.J. resident add 6%. Prices subject to change.

Shipping

For shipping and handling add 3%. ($3 minimum) Larger shipments require additional charge.

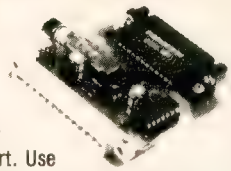
Catalog

We sell a large selection of hardware and software. Send $1 for catalog, refundable with order.

C-64 / VIC-20 RS-232

INTERFACE

$ 39 95



MFJ-1238

Provides RS-232 voltage conversion for C-64/VIC-20 serial port. Use RS-232 printers, modems, speech synthesizers, other peripherals. Switch reverses transmit/receive lines. Use as null modem. 25 pin RS-232 connector. Plugs into user's port. 2¼x2¼ inches.

C-64/VIC-20

MODEM

$ 49 95

MFJ-1237

High performance Texas Instrument single chip design. For C-64/VIC-20. Plug into user port. For single or multiline phones. Plugs into phone base. 300 baud, Direct connect, Originate/Answer Full duplex, Carrier detect LED, Crystal controlled Includes Basic listing of Terminal Program.

Order from MFJ and try it. If not delighted, return within 30 days for refund (less shipping).

One year unconditional guarantee.

Order yours today. Call toll free 800-647-1800. Charge VISA, MC. Or mail check, money order.

CALL TOLL FREE . . . 800-647-1800

Call 601-323-5869 in MS, outside continental USA.

MFJ ENTERPRISES INCORPORATED

921 Louisville Road, Starkville, MS 39759

CARTRIDGE CRACKER™

WITH

ECA BACKUP™ AND SUPER SAVER™

PACKAGE INCLUDES:

1. EXPANSION BOARD
2. **CARTRIDGE CRACKER™** SOFTWARE TO BACKUP MOST CARTRIDGES.
3. **ECA BACKUP™** SOFTWARE TO BACKUP ELECTRONIC ARTS™ DISKS.
4. **SUPER SAVER™** SOFTWARE FOR FILE COPYING AND DISK TO TAPE COPYING
5. USERS MANUAL.

FOR ARCHIVAL USE ONLY. IT IS ILLEGAL TO SELL OR DISTRIBUTE COPYRIGHTED SOFTWARE.

FOR **COMMODORE 64** **$44.95** + SHIPPING

Bear Technologies INC

VISA AND MASTERCARD ACCEPTED

3417 ROGER B. CHAFFEE BLVD.
GRAND RAPIDS, MI 49508
(616) 245-5061

ADD $3.00 SHIPPING + HANDLING
MI. RESIDENTS ADD 4% SALES TAX

NICK'S BASIC
AND
NICK'S SWIFT COPY

NICK'S BASIC

ADDS OVER 128 POWERFUL COMMANDS TO THE C-64 BASIC LANGUAGE...FOR THE PROFESSIONAL AND BEGINNER...

NICK'S BASIC fully supports the C-64 in the following areas:

HIRES GRAPHICS: line, fill, circle, box, move, copy, inverse, **4 way scrolling**, shape tables, htext, flip, hi-res **windowing**, and many more.

MUSIC: play, wave, volume, note, sound, autoplay, adsr, **3 voice** interrupt driven music.

DOS: Fast DOS routines including: **15 sec disk format**, bload, bsave, brun, load, save, autorun, lock and unlock files, write protect disk, catalog, append, commands for programming within the **disk drive memory** (up/down loading and execute), and more.

FILE HANDLING: tload, tsave, show, record, input, diskread, and special commands for using random access (REL) files, strings up to **255** characters long.

TEXT CONTROL: htab, vtab, locate, scrn, save screen, load screen, **4 way scrolling**, colorfill, put, and many more.

STRING HANDLING: insert, duplicate, reverse, array **find**, array **sort**, string **format**, and **swap**.

SPRITES: sprite base, sprite place, sprite data, block, and commands for **game** programming.

CHARACTERS: charcopy, charset, charput, unput, look, charcolor, chardata, and charblock.

EDITING: renumber (all line references including Gotos, Gosubs, etc.), find, replace, delete, 2 way program scrolling, dump, edit, trace, **move** and **copy** groups of lines, and program merge.

GAME COMMANDS: joy stick, paddle, and light pen control.

MISCELLANEOUS: labeled lines, **print using**, **if-then-else**, hex-decimal-binary conversion, full support of function keys, trap (errors), hard copy, move-copy-fill memory, define **USR-BRK-NMI** interrupt vectors, 6 expansion vectors for expanding NICK'S BASIC!

- NICK'S BASIC is **fast** loading from disk **(8 sec.)** and uses less than 1K of BASIC RAM.
- NICK'S BASIC lets the user add commands with ease. A **command interpreter** (with source code) and examples are provided on the disk.
- Also included: hi-res shape editor, character editor, and a **COMMAND EDITOR** which lets you change the names of any of the commands and save them!
- Fantastic for designing **ARCADE QUALITY** games.
- Fully documented, complete with examples. All this and **so much more** for **$39.95** (DISK); Cartridge (inquire).

A **MINI-COMPILER** is available ($29.95) which allows users to sell or distribute programs written using **NICK'S BASIC** without the end users having to purchase **NICK'S BASIC**.

NICK'S SWIFT COPY

Much more than just "THE BEST COPY PROGRAM," it is a SUPER DISK UTILITY SYSTEM

- Copies **almost all** protected disks **automatically**
- **THREE MINUTE** backup of your standard disks (and many protected disks also)
- Copies and/or creates errors **20, 21, 22, 23, 27, 29** on any track/sector
- **15 second disk format**; copies file types **SEQ,USR,PRG,REL**
- Sector editor with drive **monitor/disassembler**; view and edit **sector headers**
- Full DOS support including: lock, unlock, undelete, re-close files; **view files** in hex, decimal, ASCII, **assembly**, and even **BASIC**
- Parameter files for backup of heavily protected disks
- **DISK ANALYZER** analyzes disk for: ½ tracking, extra sectors, bad sectors **(tracks 1-37)** and non-standard SYNC (analyzes for newest protection schemes)
- Supports 1 or 2 1541 disk drives
- Drive head never "**kicks**" or "**chatters**" when copying
- **ABSOLUTELY** no hardware modification required
- All of this and so much more for only **$34.95**

DELIVERY: Shipping and handling add $3.00 per order. For fast delivery use cashier's check or money orders. VISA and MASTERCARD add $2.00. For a complete description of these programs and for our other in house Commodore 64 programs send a stamped, self addressed envelope to:

Computer Division

Southern Oregon Video Enterprises, Inc.

P.O. Box 400 • Ashland, Oregon 97520 • (503) 482-5054

COMMODORE 64 is a trademark of COMMODORE ELECTRONICS, LTD.

Bug-Swatter:
Modifications And Corrections

• Programs 3 and 4 from "Disk Tricks" (September) were designed to scratch and unscratch (recover) files from a disk. Several readers have informed us that it is essential to use the Validate command after using either of these programs. **OPEN 15,8,15: PRINT#15, "V0" :CLOSE 15** properly validates the disk and updates the Block Allocation Map (BAM). You can validate in direct mode or from within the program, but it should be noted that this command can destroy random files (program, sequential, and relative files are safe). See the 1541 User's Manual for more information about validating.

Without this line, the scratch program will scratch a file, but not free up the disk space used by the program. More seriously, if a program is unscratched without validating the disk, subsequent SAVEs can overwrite the disk space used by the program.

For corrections to program 2 (Change Disk ID) see last month's Bug-Swatter.

• "Screen-80" (September) works as listed with a 64 and disk drive. However, tape users have had problems reloading the program after using MLX. This is not a flaw in Screen-80; it happens because MLX saves ML programs as *absolute* files, the equivalent of **SAVE "program",1,1**. Screen-80 is created at memory location 49152 but is meant to be relocated to the beginning of BASIC.

If you've typed in Screen-80 and saved it to tape, however, you won't have to retype it. Just load MLX and change line 763. The third POKE (POKE 782,1) should be changed to POKE 782,0. Change line 763 and enter RUN. Use the same starting address (49152) and ending address (52811). Use SHIFT-L to load Screen-80 from tape. Then SHIFT-S to save it to tape. The modification to line 763 will cause the newly saved program to be relocatable. You can then turn your 64 off and on, and load Screen-80. If you LIST it, you should see one line with a SYS command. Type RUN and you'll have 80 columns. We regret any inconvenience this error has caused our readers.

• Reader Ina Neiman uses the 64 version of "Spelling Critter" (June) in her classroom and has discovered that vocabulary words which are contractions (can't, won't, and so on) are not accepted by the program. The program allows only letters between A and Z. To include apostrophes, add the following line:

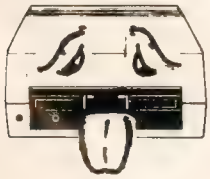
885 IF ASC(Z$)=39 THEN A=39:GOTO 920

• The 64 version of "Mystery At Marple Manor" (September) works as listed, but there are two minor corrections.

First, in line 27 the Automatic Proofreader number is correct, but the line is not. The last English pound sign (£) should have been underlined, to indicate a SHIFTed character. This typo affects only part of the graphics on the title screen.

Second, if you choose to stay in a room and type a letter which is not on the menu, the screen may go blank (although further input will be accepted). To reprint the menu after typing an incorrect letter, change lines 390 and 400, replacing all 387s and 398s in these lines with a 375 (the beginning of the routine which prints the menu).

HAVE YOU GOT THE 1541 BLUES?



WE'VE GOT THE PERMANENT FIX!!

Send us your sick 1541 and a check for $69.95 plus 5.00 shipping and we'll not only align your drive, we'll fix it so it will STAY THAT WAY.

We guarantee it for 6 months.

We also service the complete COMMODORE COMPUTER LINE with a 48-hour turn-around time.

TRIAD COMPUTERS
3068 Trenwest Dr.
Winston-Salem, NC 27103 (919)765-0433

DISK SLEUTH
finds missing programs!

A DELUXE DISK ORGANIZING SYSTEM for the Commodore 64 that creates a DATA-BASE of your disk program library.

- ALPHABETIZED MASTER DIRECTORY of up to 2000 disk program names can be printed, scrolled, or searched.
- COMPLETE PROGRAM INFORMATION — name, disk, index number, load address, file type, program block length, plus your own personal program comments.
- 3 TYPES OF NAME SEARCHES — wild cards.
- EASY TO USE — input from your disks.
- 100 DISK INDEX LABELS INCLUDED.
- WINDOWS for disk program information
- INTRODUCTORY PRICE $29.95

ELECTRONIC CIRCUIT ANALYSIS ... $29.95
Analyzes the response of most circuits up to 25 nodes, 40 branches (resistors, caps, coils, FET's, NPN's & Op-Amps), and ladder circuits up to 200 branches.

ELECTRONICS DESIGN UTILITIES ... $19.95
13 programs to solve design problems.

All programs available on disk only for the Commodore 64. Prices Postpaid. California residents add 6 % sales tax

Nth DIGIT SOLUTIONS
3243 Arlington Avenue, No. 195
Riverside, CA 92506

MASTER THE MYSTERIES OF THE COMMODORE 64

Learn to program like a pro

- Easy structured lessons
- Fully explained experiments
- Software disk contains: sound tutor, music demo, machine language monitor, sprite editor, and more
- All for only $49.95 + $2.00 postage and handling
- Specify Disk or Cassette

Also Available.
The Commodore 64 VIC-II Chip explained..$10.95
The Commodore 64 SID chip explained....$10.95
Add $1.00 postage and handling

Order NOW! Send check or money order to

THE COMPUTER TUTOR
Box 183, Grandville, MI 49418

WIZARD'S DOMINION

ONLY THE BRAVEST DARE TO ENTER!! ARM YOUR CHARACTER WITH WEAPONS AND MAGIC. THEN FIND GOLD AND FIGHT OGRES AND GAIN NEW MAGICAL POWERS.

- *3-D PERSPECTIVE*
- *SUPERB GRAPHICS*
- *COMPLEX BATTLES*
- *LOTS OF MAGIC*
- *THOUSANDS OF CAVES*

COMMODORE 64

TI 99/4A (EXTENDED BASIC)

CASSETTE $19.95 DISK $21.95

DEALER INQUIRIES WELCOME

INSTRUCTIONS INCLUDED. To order send check or money order plus $1.50 shipping/handling to:

American Software
Design & Distribution Co.
P.O. Box 246 Dept. G-6
Cottage Grove, MN 55016

FREE Comm.64 Book

** GET ONE BASIC BOOK FREE WITH EVERY ORDER **

MACROFIRE Editor/Assembler for C-64
This powerful tool for the machine language programmer consists of three parts full screen oriented editor (similar to the wordprocessor), very fast assembler with macro capability, machine language monitor The assembler translates in three passes, physical and logical address, macros expanded/not expanded, include function for large source codes, source code can be saved/loaded on disk or cassette from the editor, object code can be saved/loaded from the monitor Assembler gives list of used and unused labels, physical endaddress Disk or cassette Comes with book No 184
Order-No. 4963 $ 89.00

SIXTY FORTH
This FORTH is an extended fig-FORTH adapted to the Commodore 64 Available on disk only
Order-No. 4960 $ 39.00

SUPERMAILING for C-64
This mailing list program allows you to handle up to 1000 addresses on one disk Each address consists of 9 parameters, these are: name, company, street, city, state, zip-code, code 1, code 2, phone number You can print labels, or search for any parameter, for example all addresses from California Available on disk only
Order-No. 4962 $ 49.00

HARDWARE ADD-ONs

Parallel Printer Interface for C-64
This item allows you to hookup a parallel printer with a Centronics type interface to your Commodore-64 via the user port All you have to do is make the proper connections from the user port to your printer The software driver for this interface comes on disk or cassette Eight data bits are transmitted, thus this interface also can print graphics (if the printer has that capability) The BUSY and STORE signals are used for handshaking between computer and printer. The software even has the complete Commodore character set built in so that you can print Commodore characters on a non-Commodore printer!
This kit consists of the software driver on disk or cassette, the instructions, and the plug for the user port
Order-No 4990 $ 19.95

Universal Experimenter Board for C-64
This board plugs into the expansion port of your Commodore-64. It allows you to build your own expansion circuits This board is recommended with the book No 185
Order-No. 4970 $ 9.95

Expansion Board for C-64
This board allows you to use up to four universal experimenter boards at the same time. All the signals are parallel at all four slots. There is room provided for decoding circuits The expansion board comes with one plug for one universal experimenter board.
Order-No. 4992 $ 29.95

Dealer and Distributor inquiries are invited
ELCOMP PUBLISHING, INC.
2174 West Foothill Blvd., Unit E, Dept. 36
Upland, CA 91786
Phone: (714) 623-8314, Tlx.: 29 81 91

PAYMENT: Check, VISA, MC
CA residents add 6 % sales tax.
Add $ 2.00 for shipping.
Outside USA. add 15% for shipping

In Singapore contact. telex 22 456
In Germany contact: telex 52 69 73

CASSETTE INTERFACE ADAPTER

VIC 20* C-64*

- Signal level indicator enables perfect load every time
- Allows computer to control cassette motor
- Cassette on-line indicator
- Plug directly into cassette port
- Use standard cassette recorder
- Fully documented
- 90-day full warranty

TERMS: Check or M.O (allow 4-6 wks) COD add $5 00

$25.95

Add $3 00 shipping OK residents add 5% sales tax

DSM MARKETING
P.O. BOX 7647
OK CITY, OK 73153

*Trademarks of Commodore Electronics, Ltd.

HOMEWORK HELPER FRACTIONS or ARITHMETIC

Lets your children enter textbook homework problems into the computer and then helps them through each step. When finished the screen displays the problem exactly as it should be turned into the teacher. Includes help features and color screens.

TOPICS

Arithmetic — Add, subtract, multiplication and long division. For 4th-6th grades.

Fractions — reduce to lowest terms, mixed numbers, compare, equivalents, common multiples, add, subtract, multiply, divide. For 5th-7th grades.

Programs for C64, tape or disk — $13 for one or both for $20. Send check or MO

DEB HOMEWARES
4044 Westlake Dr., Cortland, Ohio 44410

Also available — **SPORTS-LINE** helps you pick the office pro-football pool. $20 disk only.

Money back guarantee if not satisfied.

(ABS)OLUTE SOFTWARE
INTRODUCES

COMPUFILE

THE (ABS)OLUTE DATA BASE FOR
COMMODORE 64 COMPUTERS

Some Features
- True Relative Disk Files
- Multiple Data Bases Allowed On A Single Disk
- Completely Menu Driven, Including Disk Directory
- Up To 20 User Defined Fields Per Record
- No Software Limit On Number Of Records Per Data Base
- Searches & Sorts On Any Field
- Adds, Deletes, Modifies Records
- Clear & Thorough Documentation

And The Best Feature: **Compufile** *has an Introductory Price of Only $29.95!!*

Look For **Compufile** At Your Local Commodore Dealer, Or Send $39 95 To

(ABS)OLUTE SOFTWARE
1780 AUSTIN HIGHWAY
SAN ANTONIO, TEXAS 78218
(512) 828-2679

Dealer Inquiries Invited

(ABS)...The First Name In Commodore Computing

FAMILY TREE (REVISED)
PET-I-GREE (NEW)

FAMILY TREE — Keep track of your ancenstry with pedigree charts and family record sheets from our popular program that has now been updated and revised. 664 names per disk, up to 6 generation charts, improved editing, more user friendly. $49.95 U.S.

PET-I-GREE — A new program for the dog breeder and kennel operator that keeps A.K.C. records and produces required pedigree charts and information files.

For information write or phone:

GENEALOGY SOFTWARE

Phone 519-344-3990

P.O. Box 1151
Port Huron, Michigan 48061

1046 Parkwood Ave.
Sarnia, Ontario N7V 3T9

FOR COMMODORE 64™
DISKMIMIC 5+™

- Backs up virtually all existing disks for Commodore 64™ including Copy Protected Versions. ALL AUTOMATICALLY.
- Supports 1541™ Drives.
- Don't be without back-up!!
- Formats disk in less than 20 seconds.

Now 3 Times as Fast!

BACKS UP ENTIRE COPY PROTECTED DISKS IN LESS THAN 8 MINUTES.

ONLY $49.95

A.I.D. CORP.
4020 HEMPSTEAD TURNPIKE
BETHPAGE, NEW YORK 11714
(516) 731-7100

Diskmimic 5™ is a trademark of A.I.D. Corporation
Commodore 64™ & 1541™ is a trademark of Commodore Electronics Ltd.

Shipping & Handling — $1.50 each
DEALER INQUIRIES INVITED

DAI Structured BASIC
ADD 100 Additional Commands To Commodore-64 ™ BASIC

- Multiple-line nestable control structures
  - DOWHILE / LOOP
  - IF / THEN / ELSE / ENDIF
  - SELECT / CASE / DEFAULT / ENDSELECT
- Extended variable names (up to 8 characters)
- Label Names for GOSUB, GOTO, TRAP
- Sophisticated PRINT USING, PRINT AT
- Sprite and sound commands
- System commands (AUTO, DELETE LINES, etc.)
- Also: capability of adding user-defined commands
- Excellent documentation and delux package: 70-plus pages, 3-ring binder, duplicate diskette.

Send $39.95 plus $2.00 for postage & handling to:

Dooley Associates, Inc
2250 Woodlawn SE
Grand Rapids, MI 49506
(616) 942-1088

VISA & MC accepted
MI residents add 4%

Commodore 64 is a trademark of Commodore

BACK-UPS

WE CAN COPY ANY DISK, CARTIDGE OR TAPE FOR THE COMMODORE 64 OR VIC-20. ENCLUDING ALL SYNAPSE, ELECTRONIC ARTS, ATARI SOFT AND MORE.

YES IT IS LEGAL

THE COPYRIGHT LAW SECTION 117 GIVES YOU THE LEGAL RIGHT TO COPY OR, TO AUTHORIZE THE MAKING OF A COPY, FOR ARCHIVAL PURPOSES.

WE ARE MAKING THIS OFFER IN STRICT COMPLIANCE WITH THE COPYRIGHT LAWS YOU MUST PROVIDE PROF OF OWNERSHIP. WE SUGGEST ONE OF FOLLOWING.

1. SEND US YOUR PROGRAMS.
2. SEND US YOUR SALES SLIP.

YOU MUST SEND US A LETTER STATING THAT YOU ARE THE LEGAL OWNER AND THAT YOU ARE AUTHORIZING US TO MAKE YOU A SINGLE COPY.

COSTS
1-2....$4.00 EACH
3-5....$3.50 EACH

ENCLOSE (1) BLANK DISK FOR EACH COPY OR ADD $ 2.00 PER COPY AND WE WILL SELL YOU A DISK. ADD $ 1.00 TO TOTAL ORDER FOR RETURN SHIPPING.
NOTE : DUE TO USER GROUPS AND CLUBS WE MUST LIMIT YOUR ORDER TO 5 COPIES AT A TIME. THERE WILL BE ABSOLUTLY NO DUPLICATION OF PROGRAMS.

TERMS : COD, PERSONAL CHECK OR MONEY ORDERS. SORRY NO CREDIT CARDS PLEASE.

THE DUPLICATORS
P.O. BOX 8952
BOISE IDAHO 83707

The Gardener's Assistant
to Plan and Plot Your Garden Efficiently

- Graphic display of garden layout
- Recommended planting dimensions
- Planting/harvesting dates for your region
- Quantity to buy and plant
- For the novice gardener, operates with minimal input — Easy to use
- For the experienced gardener, allows tailoring and expansion of all data including addition of specialty crops
- Data on Over 50 Vegetables Included

Commodore 64, *$29.95* Apple II+, *$39.95*
IBM PC, IBM PCjr, *$45.00*
(VA add 4% sales tax)

Shannon Software, Ltd
PO Box 6126 Falls Church, VA 22046
Phone (703) 573-9274

TUTOR with your COMPUTER

Educational SOFTWARE tutors your child, step-by-step. Teacher-created, educationally sound, *remarkably effective!*
For

- MATH
- LANGUAGE ARTS
- SOCIAL STUDIES
- PRESCHOOL

For Apple II+, IIe, Commodore 64, TRS-80 Models III & IV.

DAYBREAK

Send for **FREE** brochure.
DAYBREAK SOFTWARE
(Div. of Educational Activities)
1951 Grand Avenue, Dept. CG
Baldwin, NY 11510

1-800-645-3739 (U.S.) 516-223-4666 (N.Y., AK., HW.)

ORIGINAL ELECTRONIC
BARTENDER

Let...**The Electronic Bartender** show you what drinks you can make using the ingredients you have on hand OR select recipes by name.

The Electronic Bartender
- Automatically multiplies recipes
- Displays the correct glass to use
- Has hundreds of recipes
- Is the perfect gift

SPECIFY: ★IBM PC, PC Jr., XT
★Apple II+, IIe, IIc ★ Commodore 64
★Requires one disk drive

C.O.D. **$19.95**
Order 24 hrs, 7 days
Call **800-348-2729, Extension 24**
or send check or money order to:
WTC Publishing, Inc., Suite 25
131 N.W. Fourth St. • Corvallis, OR 97330

FREE PC BOOK

★★ GET ONE BOOK FREE FROM THIS AD WITH EVERY $ 20.00 PURCHASE ★★

The Great Book of Games
This book contains the listings of 46 programs for the Commodore-64. The first part of the book contains ready to run programs in Commodore BASIC. The second part of the book teaches you in detail, how to take advantage of the powerful new features of your C-64. Features such as color, high-resolution graphics, scrolling, sprites, sound, joysticks, and paddles. 144 pages
ISBN 3-88963-182-7.
Order-No. 182 (Book) $ 9.95
Order-No. 4988 (Disk) $ 19.95

More on the Sixtyfour
Machine language for the advanced user. This book contains programs and instructions about such interesting tasks as output of text, the filesystem, RS232 interface, realtime clock, how to add new BASIC commands, hires assistant, disk-utility, device handlers, centronics interface, screenprint, terminal, data transfer between an ATARI and a C-64, A/D converters, etc
Order-No. 183 (Book) $ 9.95
Order-No. 4989 (Disk) $ 19.95
(Source and object code plus supermon monitor)

How to program your Commodore-64 in Machine Language
Introduction into the 6502/6510 machine language for the BASIC programmer
Order- No. 184 (Book) $ 12.95
Order-No. 4702 (Disk) $ 19.95
(Source code and object code)

Commodore-64 Tune-up
This book tells you about hardware expansions of your Commodore-64. Expansions via the user port, the expansion port, the ROM area, like control of LEDs, opto-couplers, light detector, accustic switch, A/D converter, use of EPROMs, measurement of temperature, operational amplifier, RS232 interface, etc., 146 pages, ISBN 3-88963-185-1
Order-No 185 (Book) $ 12.95
Order-No. 4703 (Disk) $ 29.95
(BASIC, FORTH, and machine language programs)

Small Business Programs for the C-64
This book contains the listings of many programs that turn your C-64 into a powerful business computer. The programs range from depreciation calculations over mortgage calculations to a complete business package with invoice writing, mailing list and inventory control working together. 121 pages, ISBN 3-88963-186-X
Order-No. 186 (Book) $ 12.95
Order-No. 4704 (Disk) $ 29.95

29 Programs for the Commodore-64/264
This book contains the listings of a variety of programs for your C-64/264 computer. The programs range from several games over a powerful sprite editor to 3-D plot and forecasting of future events. 148 pages
ISBN 3-88963-055-3
Order-No. 56 (Book) $ 9.95
Order-No. 4705 (Disk) $ 19.95

Dealer and Distributor inquiries are invited.
ELCOMP PUBLISHING, INC.
2174 W. Foothill Blvd., Unit E
Upland, CA 91786
Phone: (714) 623-8314, Tlx.: 29 81 91

PAYMENT: Check, VISA, MC
CA residents add 6% sales tax.
Add $ 2.00 for shipping.
Outside USA: add 15% for shipping
In Singapore contact: telex 22 456
In Germany contact: telex 52 69 73

MIG® ENTERPRISE
presents

THE CAR MAINTENANCE EXPENSE PROGRAM

Now you can keep track of all those oil changes, repair bills, tune ups, insurance payments, and more.

This disk for the Commodore 64 will support up to 4 vehicles. Enter, retrieve, and print by vehicle, year and category.
The disk has 8 fixed, and 2 user definable categories.

$15.95

Please send check or money order: to
P.O. BOX 267
OLD CHELSEA STA.
NEW YORK, N.Y. 10113

THE GENERIC BBS

3 ATLAS 67

A menu driven bulletin board program
Easily customized via Menu
Feature packed for the Commodore 64
Commodore 1650 Automodem and a single 1541 disk drive

Only $79.95

Atlas Software
4120 Lakeland Avenue
Robbinsdale, MN 55422
(612) 533-8790

Dealer enquiries welcome!

SIGN OF THE SPHINX

Aficionados of the arcane, disciples of doom, students of the sinister and masters of the macabre have a new home-in the future dark age of a dying Earth.

Werewolf Software is at it again - serving up full-strength doses of adventure, mystery and weirdness in our new adventure, Sign of the Sphinx.

From the dark shrines of bizarre cults to the ruins of ancient and modern civilizations, you can trace fragments of forgotten knowledge to the final secret at the Crimson Altar.

Text adventure on disk for the Commodore 64. $23 postpaid from:

Werewolf Software
109 Minna Street, Suite 353
San Francisco, CA 94105

CHIPMONK SOFTWARE
C-64

CHRISTMAS CAROLS--Words & Music
BIBLE MEMORY-Memorize Scripture
BIBLE SCRAMBLE-----Book Quizzer
GREAT HYMNS-------Words & Music
MUSICMAN-------Music Programmer
QUICK FILE'EM--Easy Disk Filing
CAT N MOUSE---Word Recoginition
SPELLING SCRAMBLE--Best Speller
MEMORY TUTOR----Improves Memory
CHECKTRACKER----Bank Bookkeeper
SONGS FOR KIDS----Words & Music
RESET SWITCHES----------$9.00

$15 Each 3/$35
631 N. Cherry
Battleground, Wn. 98604
Send SASE for catalog & Reviews

FREE Comm.64 Book

★★ GET ONE BASIC BOOK FREE WITH EVERY ORDER ★★

BLIZTEXT 1.1 Wordprocessor for C-64
This wordprocessor has all the features that you expect from a good wordprocessor plus some additional features. The standard features include
Full screen oriented editing with horizontal and vertical scrolling, dynamic formatting, printer control codes can be imbedded anywhere within the text, for underlining, shift to a different front, and whatever else your printer can perform, works with all printers (parallel, serial, IEEE), single keystroke for disk directory and error channel, global or local search and replace, left and right margin justification, centering, page numbering, footnotes heading, calculations within the text, different screen and border colors definable, copy register to move/duplicate portions of the text, double line spacing, definable form length and width, indent paragraph, text can be saved on disk or cassette, in normal format or in Commodore format, text can be saved either including all format commands, or in a formatted form, so that it can be checked by a spelling checker, lines can be up to 250 characters long, 40 columns can be seen at a time.

The additional features of BLIZTEXT 1.1 are:
An INCLUDE function for large texts that cannot be held in memory at the same time, you can include textfiles on up to four disk drives. This gives you control over every large texts, you can print a whole book that way. About 26000 characters can be in memory at the same time, in addition to that you have room for more than 4000 characters in the copy register
The terminal facility built into the BLIZTEXT 1.1 program allows you to send/receive electronic messages via the phone system and a modem (VIC, HES, or Smart Modem). This gives you tremendous opportunities, for example, you can receive and at the same time store data from a data base, or a writer can prepare texts at home and then send them to a typesetting machine. The terminal mode also can be used to send/receive information from another computer via a RS232 signal. Everything can be defined with the terminal mode, like the number of stop bits, the word length, the baudrate, parity, full or half duplex, 3 line or X line. Program is available on disk and on cassette (pls specify)
Order-No. 4965 only $ 49.00

BLIZTEXT COMBO PACKAGE
This package consists of the BLIZTEXT 1.1 wordprocessor plus the following tools working in conjunction with BLIZTEXT. A complete mailing list program with an option allowing you to merge addresses with a letter created by BLIZTEXT
A program which allows you to convert a sequential file into a BASIC program file, so that you can use BLIZTEXT to edit BASIC programs
A printer driver which allows you to build a very inexpensive printer interface for all CENTRONICS compatible printers.
Order-No. 4966 $ 89.00

Dealer and Distributor inquiries are invited.
ELCOMP PUBLISHING, INC.
2174 West Foothill Blvd., Unit E, Dept. 36
Upland, CA 91786
Phone: (714) 623-8314, Tlx.: 29 81 91

PAYMENT: Check, VISA, MC
CA residents add 6 % sales tax.
Add $ 2.00 for shipping.
Outside USA: add 15% for shipping
In Singapore contact: telex 22 456
In Germany contact: telex 52 69 73

ADVERTISERS INDEX

Reader Service Number	Advertiser	Page
102	Abacus Software	147
103	Abacus Software	149
104	Abacus Software	151
105	(Abs)olute Software	222
106	Academy Software	113
	A.I.D. Corp.	222
	Alfred Publishing Co., Inc.	79
	American Software Design & Distribution Co.	222
107	Artificial Intelligence Research Group	216
	Assembly Technology	216
	Atlas Software	223
108	The Avalon Hill Game Company	7
109	BASIX	99
110	BASIX	211
111	BASIX	219
112	Batteries Included	91
	Bear Technologies	220
113	Big Bytes	165
114	British Intelligence	96
115	Broadway Computer Corporation	165
116	Bytes & Pieces, Inc.	211
117	Cardco, Inc.	IBC
118	Cardinal Instruments	214
	Cardinal Software	216
119	Cheatsheet Products	166
	Chipmonk Software	223
120	Chromazone Software	209
121	Columbia Software	208
122	Comm 64 Training Tape	154
	Commodore Computers	BC
123	CompuServe	39
	ComputAbility	105
	Computer Centers of America	163
124	Computer Mail Order	212
125	Computer Profit Systems, Inc	75
	Computer Revelations, Inc.	209
	The Computer Tutor	221
126	Covox, Inc.	170
	Creative Software	4
127	Crown Custom Covers	214
	Crown Publishers, Inc.	209
128	C.S.M. Software	74
129	Currah Technology	17
	Datamost, Inc.	137
	Datamost, Inc.	153
130	Datasoft, Inc.	69
131	Datasoft, Inc.	161
132	Davidson & Associates	71
133	Daybreak Software	223
	Deb Homewares	222
134	Digital Wizardry	61
135	Dooley Associates, Inc.	222
136	Dow Jones News/Retrieval	117
	DSM Marketing	222
	The Duplicators	222
	Dynastar Productions	219
137	Eastern House	211
	Elcomp Publishing, Inc.	222
	Elcomp Publishing, Inc.	223
	Elcomp Publishing, Inc.	223
	Electronic Arts	81
	Electronic Arts	83
	Electronic Arts	85
	E Mart, Inc.	133
138	Eng Mfg., Inc.	14
	Epyx	13
	Epyx	15
139	Ergo Systems, Inc.	139
	Genealogy Software	222
140	Genesis Computer Corporation	217
141	The Gold Disk	111
142	Harper & Row	117
	Hayden Book Company	112
143	HesWare	131
	HesWare	133
	HesWare	136
	HesWare	159
	HesWare	161
144	Indus Systems	103
145	Inforunner Corporation	47
	Inkwell Systems	115
	Jason-Ranheim	144
	John Henry Software	89
146	Koala Technologies	57
147	Kyan Software	218
	Loadstar	131
	Lyco Computer Marketing & Consultants	215
148	MFJ Enterprises Incorporated	220
	Micol Systems	110
149	Microbits Peripheral Products	27
150	MicroProse Software	63
151	Micro Sci Corp.	78
	Micro-Sys Distributors	157
152	Micro-W Distributing, Inc.	68
	Micro World Electronix, Inc.	114
	Micro World Electronix, Inc.	165
	MIG Enterprise	223
153	MMG Micro Software	141
154	MSD Systems, Inc.	42,43
155	New American Library	145
	NRI Schools	135
	Nth Digit Solutions	221
200	Okidata	33-36
156	Orange Micro Inc.	45
157	Orbyte Software	18,19
	Orion Enterprises	114
158	Parsec Research	132
159	PC Gallery	219
	Penguin Products	68
160	Program Design, Inc.	140
	Pro-Line Software	95
161	Protecto Enterprizes	118
162	Protecto Enterprizes	119
161	Protecto Enterprizes	120,121
	Protecto Enterprizes	122,123
	Protecto Enterprizes	124,125
	Protecto Enterprizes	126,127
	Protecto Enterprizes	128,129
163	PSI	9
164	Quicksilva Inc.	87
165	Radix Marketing	145
	Sachs Enterprises	78
166	The Scarborough System	11
	Scarborough Systems, Inc.	22,23
	Schnedler Systems	209
167	Scholastic Software	73
168	Sega Enterprises, Inc.	2,3
169	Sega Enterprises, Inc.	58,59
170	Sequential, Inc.	143
	Shannon Software, Ltd.	223
171	Sight & Sound Music Software, Inc.	50,51
172	Signal Computer Consultants, Ltd.	216
173	Skyles Electric Works	97
	Softlaw	29
174	Software Design, Inc.	49
175	Software Discounters of America	214
	Software Masters	162
176	Software Plus	218
	The Software Sector, Inc.	14
	Southern Oregon Video Enterprises, Inc.	220
177	Southwest Micro Systems Inc.	114
	Spinnaker	41
178	Star Micronics Inc.	25
179	Starpoint Software	106
180	subLOGIC Corporation	67
181	Sungem	61
182	Syntonic Corp.	165
183	Systems Management Associates	210
184	Systems Management Associates	213
185	Tailored Solutions	209
	Telesys	113
186	Tenex Computer Express	109
	3G Company, Inc.	218
187	Timeworks, Inc.	21
188	Timeworks, Inc.	31
189	Triad Computers	221
	Trillium	65
190	Tussey Mt. Software	208
191	Ty-Computing	208
	Ultrabyte	162
192	Uni-Kool	102
193	VAISALA, Inc.	107
	Werewolf Software	223
194	Woodbury Software	77
195	Word Publishing	IFC & 1
	WTC Publishing, Inc.	223
	COMPUTE! Books	93
	COMPUTE!'s Gazette Disk Subscription	53
	COMPUTE!'s Gazette Subscription	101

COMPUTE!'s Gazette
FREE Reader Information Service

Use these cards to request FREE information about the products advertised in this issue. Clearly print or type your full name and address. Only one card should be used per person. Circle the numbers that correspond to the key number appearing in the advertisers index.

Send in the card and the advertisers will receive your inquiry. Although every effort is made to insure that only advertisers wishing to provide product information have reader service numbers, *COMPUTE!'s Gazette* cannot be responsible if advertisers do not provide literature to readers.

Please use these cards *only* for subscribing or for requesting product information. Do not send any form of payment with this card. Editorial and customer service inquiries should be addressed to: *COMPUTE!'s Gazette*, P.O. Box 5406, Greensboro, NC 27403. Check the expiration date on the card to insure proper handling.

Use these cards and this address only for *COMPUTE!'s Gazette* Reader Information Service. Do not send with payment in any form.

COMPUTE!'s Gazette

102	103	104	105	106	107	108	109	110	111	112
113	114	115	116	117	118	119	120	121	122	123
124	125	126	127	128	129	130	131	132	133	134
135	136	137	138	139	140	141	142	143	144	145
146	147	148	149	150	151	152	153	154	155	156
157	158	159	160	161	162	163	164	165	166	167
168	169	170	171	172	173	174	175	176	177	178
179	180	181	182	183	184	185	186	187	188	189
190	191	192	193	194	195	196	197	198	199	200
201	202	203	204	205	206	207	208	209	210	211
212	213	214	215	216	217	218	219	220	221	222
223	224	225	226	227	228	229	230	231	232	233
234	235	236	237	238	239	240	241	242	243	244
245	246	247	248	249	250	251	252	253	254	255
256	257	258	259	260	261	262	263	264	265	266
267	268	269	270	271	272	273	274	275	276	277
278	279	280	281	282	283	284	285	286	287	288
289	290	291	292	293	294	295	296	297	298	299
300	301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320	321
322	323	324	325	326	327	328	329	330	331	332
333	334	335	336	337	338	339	340	341	342	343
344	345	346	347	348	349	350				

Circle 350 for a one year new U.S. subscription to *COMPUTE!'s GAZETTE*; you will be billed for $24. Your subscription will begin with the next available issue. Please allow 6–8 weeks for delivery of first issue. Subscription prices subject to change at any time.

Please print or type your full name and address. Limit one card per person. Please include zip code. Expiration: 1/31/85.

Name _____

Address _____

City _____

State/Province _____ Zip _____

Country _____

Place
Postage
Here

COMPUTE!'s GAZETTE Reader Service
P.O. Box 2161
Radnor, PA 19089

Turn your CRT Monitor into a television set with Cardco's new monitor tuners.

With a flick of the switch you can turn your computer monitor to provide the most vivid television pictures available. Receive a sharper, clearer television picture on your CRT monitor than you ever thought possible. Model MT/1 includes a full wireless remote control sixty-channel cable ready tuner with separate video and audio output. Completely compatible with your composite input computer monitor. For composite color or monochrome.

Also available to turn your CRT monitor into a television set is CARDCO Model MT/2, a full UHF/VHF TV tuner with separate video and audio output matched to your composite input computer monitor. For composite color or monochrome monitors.

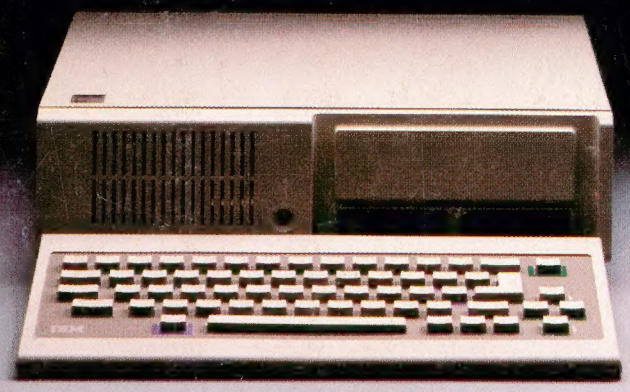
Backed by a full 90 day guarantee.

Write for illustrated literature and prices or see CARDCO Computer Accessories and Software wherever computers are sold.

cardco, inc.

300 S. Topeka Wichita, Kansas 67202
(316) 267-6525

"The world's largest manufacturer of Commodore accessories."



IT'S NOT HOW MUCH YOU PAY.

IT'S HOW MUCH YOU GET.

The computer at the top has a 64K memory.

It has the initials I, B, and M. And you pay for those initials—about $669.

The Commodore 64™ has a 64K memory.

But you don't pay for the initials, you just pay for the computer: $215. About one third the price of the IBM PCjr.™

The Commodore 64 also has a typewriter-type keyboard with 66 typewriter-type keys. (Not rubber chicklet keys like the IBM PCjr.)

It has high resolution graphics with 320 x 200 pixel resolution, 16 available colors and eight 3-dimensional sprites.

It has 9-octave high fidelity sound.

The Commodore 64 is capable of running thousands of programs for home and office. And if you add a printer or color monitor, disk drive and a modem—all together it just about equals the price of the IBM PCjr all alone. With no peripherals.

So you can buy a computer for a lot of money.

Or buy a lot of computer for the money.

COMMODORE 64

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.

Made with love by

RetroMags

20+ Years

Our goal is to preserve classic video game magazines so thatthey are not lost permanently.

People interested in helping out in any capacity, please visit us at retromags.com.

No profit is made from these scans, nor do we offer anything available from the publishers themselves.

If you come across anyone selling releases from this site, please do not support them and do let us know.

Thank you!